OMB No. 2040-0042 Approval Expires 1/31/05

United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U	KYS1630007		

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo	day	year	Date received mo	day	year	Permit Number	Well ID	FINDS Number
			04	26	2004	KYI0803		

II. Owner Name and Address

Owner Name: Olin SWD 2J-23-S41

Street Address:

Phone Number:

City:

State:

ZIP CODE:

III. Operator Name and Address

Owner Name: Quicksilver Resources Inc.

Street Address: 777 W. Rosedale St., Ste. 300

Phone Number: 817-665-4934

City: Fort Worth

State: TX.

ZIP CODE: 76104

IV. Commercial Facility

[ ] Yes
[X] No

V. Ownership

[X] Private
[ ] Federal
[ ] Other

VI. Legal Contact

[ ] Owner
[X] Operator

VII. SIC Codes

13-Oil and Gas Extraction

VIII. Well Status *(Mark "x")*

[ ] A. Operating — Date Started mo / day / year:

[ ] B. Modification/Conversion

[X] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

[X] A. Individual [ ] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
	1	Olin Lease/Project; Flippins Run Field

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
Class II	D		

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
38	00	18.8	86	07	52.5	23	S	41		1907	S	726	W

XII. Indian Lands (Mark 'x')

[ ] Yes
[X] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title *(Type or Print)*: Mark D. Whitley, Vice-President-Operations

B. Phone No. *(Area Code and No.)*: 817-665-4934

C. Signature: Mark D. Whitley

D. Date Signed: 4-15-04

EPA Form 7520-6 (Rev. 8-01)

Well Class and Type Codes

Class I Wells used to inject waste below the deepest underground source of drinking water.

Type **"I"** Nonhazardous industrial disposal well
"M" Nonhazardous municipal disposal well
"W" Hazardous waste disposal well injecting below USDWs
"X" Other Class I wells (not included in Type "I," "M," or "W")

Class II Oil and gas production and storage related injection wells.

Type **"D"** Produced fluid disposal well
"R" Enhanced recovery well
"H" Hydrocarbon storage well (excluding natural gas)
"X" Other Class II wells (not included in Type "D," "R," or "H")

Class III Special process injection wells.

Type **"G"** Solution mining well
"S" Sulfur mining well by Frasch process
"U" Uranium mining well (excluding solution mining of conventional mines)
"X" Other Class III wells (not included in Type "G," "S," or "U")

Other Classes Wells not included in classes above.
Class V wells which may be permitted under §144.12.
Wells not currently classified as Class I, II, III, or V.

Attachments to Permit Application

Class	Attachments
I new well	A, B, C, D, F, H – S, U
existing	A, B, C, D, F, H – U
II new well	A, B, C, E, G, H, M, Q, R; optional – I, J, K, O, P, U
existing	A, E, G, H, M, Q, R, – U; optional – J, K, O, P, Q
III new well	A, B, C, D, F, H, I, J, K, M – S, U
existing	A, B, C, D, F, H, J, K, M – U
Other Classes	To be specified by the permitting authority

INSTRUCTIONS - Underground Injection Control (UIC) Permit Application

Paperwork Reduction Act: The public reporting and record keeping burden for this collection of information is estimated to average 394 hours for a Class I hazardous well application, 252 hours for a Class I non-hazardous well application, 32 hours for a Class II well application, and 119 hours for a Class III well application. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW., Washington, DC 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

This form must be completed by all owners or operators of Class I, II, and III injection wells and others who may be directed to apply for permit by the Director.

I. **EPA I.D. NUMBER** - Fill in your EPA Identification Number. If you do not have a number, leave blank.

II. **OWNER NAME AND ADDRESS** - Name of well, well field or company and address.

III. **OPERATOR NAME AND ADDRESS** - Name and address of operator of well or well field.

IV. **COMMERCIAL FACILITY** - Mark the appropriate box to indicate the type of facility.

V. **OWNERSHIP** - Mark the appropriate box to indicate the type of ownership.

VI. **LEGAL CONTACT** - Mark the appropriate box.

VII. **SIC CODES** - List at least one and no more than four Standard Industrial Classification (SIC) Codes that best describe the nature of the business in order of priority.

VIII. **WELL STATUS** - Mark Box A if the well(s) were operating as injection wells on the effective date of the UIC Program for the State. Mark Box B if wells(s) existed on the effective date of the UIC Program for the State but were not utilized for injection. Box C should be marked if the application is for an underground injection project not constructed or not completed by the effective date of the UIC Program for the State.

IX. **TYPE OF PERMIT** - Mark "Individual" or "Area" to indicate the type of permit desired. Note that area permits are at the discretion of the Director and that wells covered by an area permit must be at one site, under the control of one person and do not inject hazardous waste. If an area permit is requested the number of wells to be included in the permit must be specified and the wells described and identified by location. If the area has a commonly used name, such as the "Jay Field," submit the name in the space provided. In the case of a project or field which crosses State lines, it may be possible to consider an area permit if EPA has jurisdiction in both States. Each such case will be considered individually, if the owner/operator elects to seek an area permit.

X. **CLASS AND TYPE OF WELL** - Enter in these two positions the Class and type of injection well for which a permit is requested. Use the most pertinent code selected from the list on the reverse side of the application. When selecting type X please explain in the space provided.

XI. **LOCATION OF WELL** - Enter the latitude and longitude of the existing or proposed well expressed in degrees, minutes, and seconds or the location by township, and range, and section, as required by 40 CFR Part 146. If an area permit is being requested, give the latitude and longitude of the approximate center of the area.

XII. **INDIAN LANDS** - Place an "X" in the box if any part of the facility is located on Indian lands.

XIII. **ATTACHMENTS** - Note that information requirements vary depending on the injection well class and status. Attachments for Class I, II, III are described on pages 4 and 5 of this document and listed by Class on page 2. Place EPA ID number in the upper right hand corner of each page of the Attachments.

XIV. **CERTIFICATION** - All permit applications (except Class II) must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, and by a principal executive or ranking elected official for a public agency. For Class II, the person described above should sign, or a representative duly authorized in writing.

INSTRUCTIONS - Attachments

Attachments to be submitted with permit application for Class I, II, III and other wells.

A. **AREA OF REVIEW METHODS** - Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation). The area of review shall be a fixed radius of 1/4 mile from the well bore unless the use of an equation is approved in advance by the Director.

B. **MAPS OF WELL/AREA AND AREA OF REVIEW** - Submit a topographic map, extending one mile beyond the property boundaries, showing the injection well(s) or project area for which a permit is sought and the applicable area of review. The map must show all intake and discharge structures and all hazardous waste treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:

Class I

The number, or name, and location of all producing wells, injection wells, abandoned wells, dryholes, surface bodies of water, springs, mines (surface and subsurface), quarries, and other pertinent surface features, including residences and roads, and faults, if known or suspected. In addition, the map must identify those wells, springs, other surface water bodies, and drinking water wells located within one quarter mile of the facility property boundary. Only information of public record is required to be included in this map;

Class II

In addition to requirements for Class I, include pertinent information known to the applicant. This requirement does not apply to existing Class II wells;

Class III

In addition to requirements for Class I, include public water systems and pertinent information known to the applicant.

C. **CORRECTIVE ACTION PLAN AND WELL DATA** - Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those on the map required in B, which penetrate the proposed injection zone. Such data shall include the following:

Class I

A description of each well's types, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require. In the case of new injection wells, include the corrective action proposed to be taken by the applicant under 40 CFR 144.55.

Class II

In addition to requirement for Class I, in the case of Class II wells operating over the fracture pressure of the injection formation, all known wells within the area of review which penetrate formations affected by the increase in pressure. This requirement does not apply to existing Class II wells.

Class III

In addition to requirements for Class I, the corrective action proposed under 40 CFR 144.55 for all Class III wells.

D. **MAPS AND CROSS SECTION OF USDWs** - Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection. (Does not apply to Class II wells.)

E. **NAME AND DEPTH OF USDWs (CLASS II)** - For Class II wells, submit geologic name, and depth to bottom of all underground sources of drinking water which may be affected by the injection.

F. **MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA** - Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)

G. **GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES (Class II)** - For Class II wells, submit appropriate geological data on the injection zone and confining zones including lithologic description, geological name, thickness, depth and fracture pressure.

H. **OPERATING DATA** - Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for Class III wells, a qualitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

I. **FORMATION TESTING PROGRAM** - Describe the proposed formation testing program. For Class I wells the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

For Class II wells the testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone. (Does not apply to existing Class II wells or projects.)

For Class III wells the testing must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the program formation is not water bearing. (Does not apply to existing Class III wells or projects.)

J. **STIMULATION PROGRAM** - Outline any proposed stimulation program.

K. **INJECTION PROCEDURES** - Describe the proposed injection procedures including pump, surge, tank, etc.

L. **CONSTRUCTION PROCEDURES** - Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring program, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)

M. **CONSTRUCTION DETAILS** - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

N. **CHANGES IN INJECTED FLUID** - Discuss expected changes in pressure, native fluid displacement, and direction of movement of injection fluid. (Class III wells only.)

O. **PLANS FOR WELL FAILURES** - Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or wells failures, so as to prevent migration of fluids into any USDW.

P. **MONITORING PROGRAM** - Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

Q. **PLUGGING AND ABANDONMENT PLAN** - Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on EPA Form 7520-14, Plugging and Abandonment Plan.

R. **NECESSARY RESOURCES** - Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug or abandon the well are available.

S. **AQUIFER EXEMPTIONS** - If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria: (1) does not serve as a source of drinking water; (2) cannot now and will not in the future serve as a source of drinking water; and (3) the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon production, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and time table for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR Sections 144.7 and 146.04.

T. **EXISTING EPA PERMITS** - List program and permit number of any existing EPA permits, for example, NPDES, PSD, RCRA, etc.

U. **DESCRIPTION OF BUSINESS** - Give a brief description of the nature of the business.

QUICKSILVER
RESOURCES

Via UPS Overnight Delivery

wm 4/26/04

April 15, 2004

Mr. William Mann
U. S. Environmental Protection Agency
Region 4 Office, Atlanta Federal Center,
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104

Re: Application of Quicksilver Resources Inc. for
Class II Salt Water Disposal Well Permit
Olin SWD 2J-23-S, No. 41,
Carter Coordinates Section 23, Letter "S", No. 41
Meade County, Kentucky

Dear Mr. Mann:

Enclosed please find EPA Form No. 7520-6, *Underground Injection Control Permit Application*, for the above referenced well, along with the required supporting information. Quicksilver Resources Inc. is requesting authority to use this well as a Class II injection well to dispose of salt water produced from its New Albany Shale gas wells in this area. Quicksilver requests permission to inject up to 23,000 barrels salt water per day into the open-hole interval from approximately 635 feet to 705 feet (total depth) at a wellhead injection pressure of up to 950 psig (this is the same pressure approved by the Indiana Department of Natural Resources for the Quicksilver Resources Inc. SWD D1-30B, Section 30, T5S, R4E, Permit No. 52290, approximately 1.25 miles north of the proposed well).

Notice of this application has been sent by certified mail to Arch Chemicals. Inc., the owner of all surface lands within the ¼ mile area of review for the proposed well.

Quicksilver would be happy to provide any additional supporting information you desire. If you have any questions, please call me at 817-665-4934.

Sincerely,

QUICKSILVER RESOURCES INC.

Mark N. Stephenson
Regulatory Affairs Manager

U.S. EPA REGION 4
GWD 15

777 West Rosedale Street, Suite 300
Fort Worth, Texas 76104
817-665-5000 Fax: 817-665-5005
www.qrinc.com

Attachment to EPA Underground Injection Control Permit Application
For Class II Salt Water Disposal Well
Quicksilver Resources Inc.
Olin SWD 2J-23-S41
Carter Coordinate Section 23, Letter "S", No. 41
Meade County, Kentucky

A. Area of Review Methods

The Area of Review used for this application is one-quarter (1/4) mile from the proposed wellbore. The location of the proposed well, Olin SWD 2J-23-S4, is 1907' FSL and 726' FWL of Section 23, Letter "S", No. 41, Meade County, Kentucky (see Attachment I.A, Location Plat). Arch Chemicals, Inc. (formerly Olin Corporation) is the owner of all surface lands within ¼ mile of the proposed well. The address for Arch Chemicals, Inc. is 2450 Olin Road, Brandenburg, Kentucky, 40108. The contact person is Steve Johnson, Plant Manager, phone: 270-422-660, fax: 270-422-6096. Notice of this application has been sent by certified mail to Arch Chemicals, Inc. (see Attachment I.B., Notice Letter).

LAND OWNER

B. Maps of Well/Area and Area of Review

See Attachment I.C, Area of Review Map.

C. Corrective Action Plan and Well Data

Well Data

The Olin #1 gas well is the only existing well within a one-quarter mile radius of the proposed well, Olin SWD 2J-23-S4. One existing well, the Olin #2 gas well, and one proposed well, the Olin 7-23-S41 HD1, are within a one-half mile a one-quarter mile radius of the proposed well, Olin SWD 2J-23-S4. Well data on other wells on the Arch Chemicals, Inc. (Olin) property are included in the below table.

Well Data for Wells in the Area of the Proposed Olin SWD 2J-23-S41								
Well Name & No.	Permit No.	Location S-L-N	Location Footages	Spud Date	Total Depth	Cond./Surface Casing	Prod. Casing	Status
Olin SWD #1	87775	23-S-41	1875' FSL; 725' FWL	9-3-96	3400'	13-3/8" @ 130'; 9-5/8" @ 220'	2113'	Active Inj.
Olin #1 (gas well)	87640	23-S-41	1900' FSL; 575' FWL	3-25-96	718'	13-3/8@ 133'; 9-5/8"@ 245'	713'	Active
Olin #2 (gas well)	87641	24-S-41	525' FSL; 1350' FEL	4-18-96	810'	No Conductor; 9-5/8"@ 152'	805'	Active
Olin #3 (gas well)	94732	4-R-41	1300' FSL; 1940' FWL	5-8-03	980'	No Conductor; 9-5/8"@ 399'	961'	Active
Olin #5 (gas well)	94733	3-R-41	1330' FNL; 400' FEL	5-8-03	880'	No Conductor; 9-5/8"@ 307'	866'	Active

Corrective Action Plan

Quicksilver Resources Inc. believes all wells in the area of the proposed well, Olin SWD 2J-23-S4, are adequately cased and cemented to prevent migration of fluids from the proposed well into any USDW or hydrocarbon producing zones in this area. If there is a loss of mechanical integrity in the wellbore of the proposed well, injection operations will be terminated and appropriate remedial action will be taken as quickly as feasible to restore mechanical integrity. In the event that upward fluid migration occurs in the wellbore of a previously unknown, improperly plugged or unplugged well within the ¼ mile Area of Review due to injection operations in the proposed well, injection operations in the proposed well will be terminated until such fluid migration is shut-off by the proper plugging of that wellbore.

D. Maps and Cross-Sections of USDWs

Not applicable to Class II wells.

E. Name and Depth of USDWs

The underground sources of drinking water in the area are the Alluvium and the St. Louis Limestone. The Alluvium, which is associated with the Ohio River, extends from the surface to a depth of approximately 130' and is composed of a deposition of sand, clay, and gravel. The St. Louis Limestone underlies the Alluvium and part of this formation is also considered a possible USDW (the lowermost possible USDW has been identified at approximately 250'). The New Providence Shale and New Albany Shale underlie the Alluvium and St. Louis Limestone and serve as confining zones that should effectively separate and protect the USDW from the proposed fluid injection operations.

~250'

F. Maps and Cross-Sections of Geologic Structures of Area

Not applicable to Class II wells.

G. Geological Data on Injection and Confining Zones

See Attachment 1.D., Log Section.

Injection Zone
The primary injection zone is the Jeffersonville from 640' to 700', which will be an open-hole completion. Due to the high permeability in the Jeffersonville Limestone, the casing shoe of the 7" casing needs to be set in the North Vernon Limestone immediately (5'-10') above the Jeffersonville Limestone to ensure a good cement bond, so there will be a few feet of North Vernon Limestone exposed below the casing shoe. In addition, the well will probably be drilled a few feet into the Brownsport formation immediately below the Jeffersonville Limestone to ensure that the entire Jeffersonville Limestone section has been penetrated. Quicksilver Resources Inc. believes most, if not all of the injected fluid will go into the Jeffersonville Limestone, however, because there will be a few feet of both the North Vernon Lime and Brownsport formations exposed below the casing-shoe, we request authority to inject into all three formations.

Confining Zones
The confining zone above the injection zone is the North Vernon Limestone, with an estimated thickness of 30'. The confining zone below the injection zone is the Brownsport with an estimated thickness of 124'.

Estimated Formation Tops
Surface to 130' - Alluvium (sand, gravel, and clay)
130' to 442' - St. Louis Limestome
442' to 514' - New Providence Shale
514' to 610' - New Albany Shale
610' to 640' - North Vernon Limestone
640' to 700' - Jeffersonville Limestone
700' to TD (±705') - Brownsport

OPEN Hole

H. Operating Data

Injection Fluid
The injection fluid will be produced water from the New Albany Shale formation. Quicksilver's gas wells in this area produce from the Clegg Creek member of the New Albany Shale, which is the uppermost member of this formation. The physical and chemical properties of a representative sample of the injection fluid are described in Attachment 1.E., Injection Fluid Sample.

Injection Rate

The requested maximum injection rate is 23,000 barrels of water per day. The average injection rate is not expected to exceed 20,000 barrels water per day.

Injection Pressure

The requested maximum injection pressure is 950 psi. The average injection pressure is not expected to exceed 775 psi.

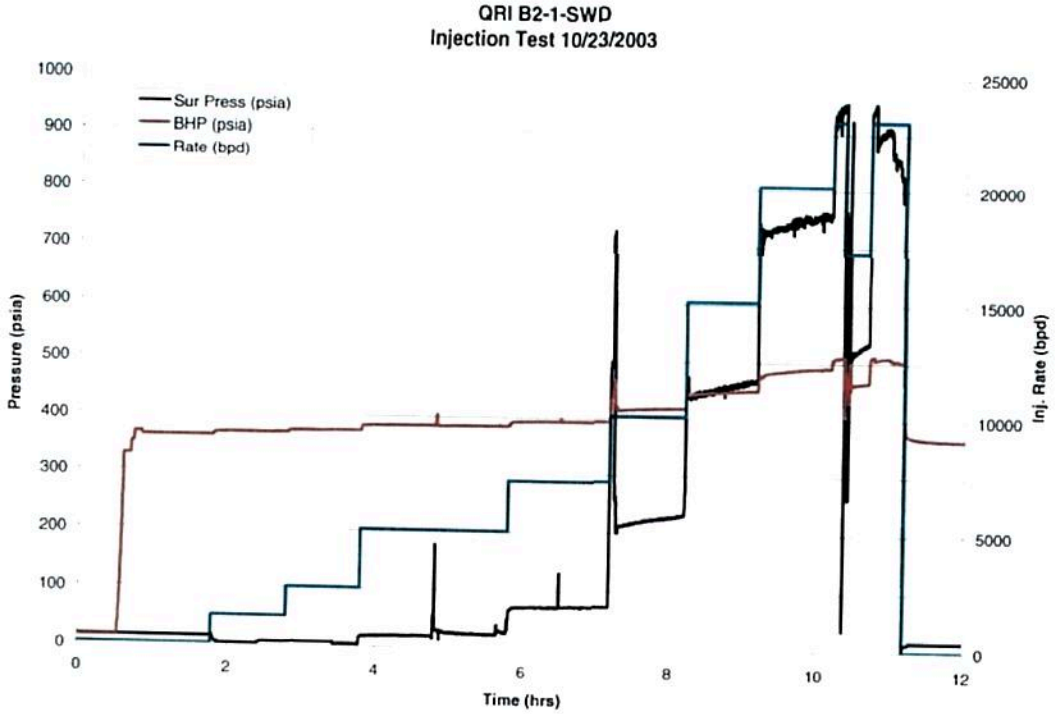
The requested maximum injection pressure (MIP) and rate (MIR) for the proposed well, Olin SWD 2J-23-S41, is based on the QRI SWD B2-1 located in Harrison Co. Indiana, in Section 2-T4S-R4E. The QRI SWD B2-1 is approximately 6,750 ft. north west of the Olin 2J-23-S41 SWD and is completed in the Jeffersonville Limestone at 889' (-217' sub sea). The estimated depth to the Jeffersonville Limestone in the Olin SWD 2J-23-S41 is 639' (-177' sub sea).

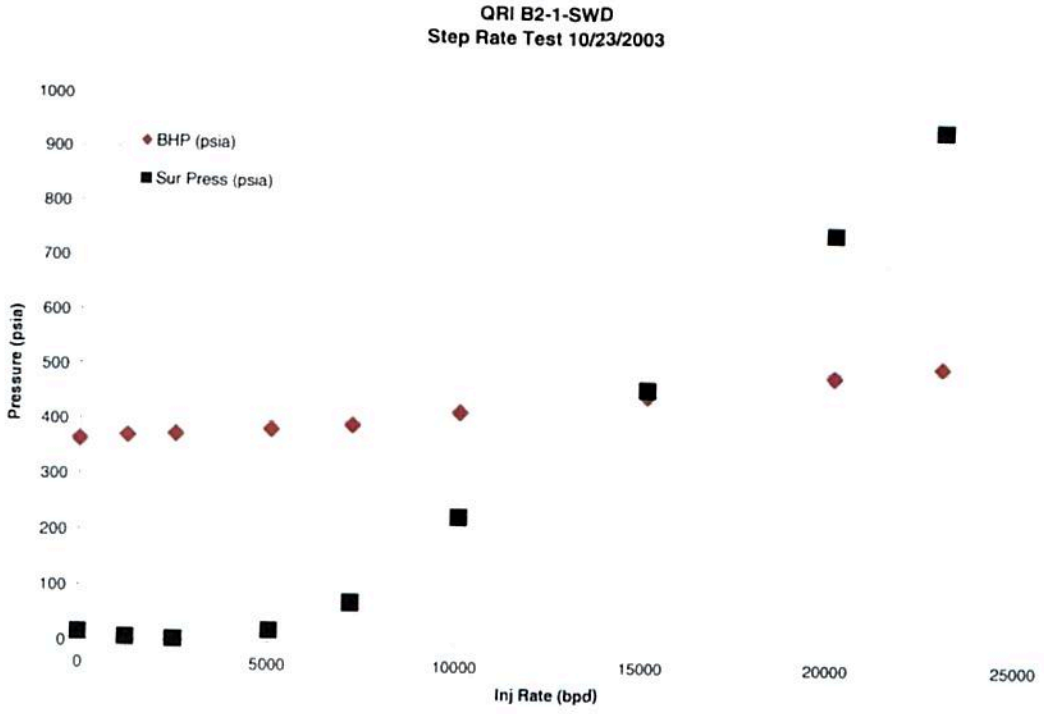
On October 23, 2003 a step-rate injection tests was performed on the QRI SWD B2-1. Electronic pressure gages were used at the surface and bottom-hole to measure the pressures during the step rate test. The figures below show the recorded data and the step-rate analysis. The step-rate analysis illustrates that at 23,000 bpd, pressure rollover did not occur indicating that the formation will take fluid at this rate and pressure (950 psia SP, and 511 psia BHP) without hydraulically fracturing.

Because these wells are in the same general area and are similar in subsea depth, we request this data be used for setting the MIP and MIR in the Olin SWD 2J-23-S41.

QRI SWD B2-1
Step Rate Test Data
October 23, 2003

Rate (bpm)	Rate (bpd)	BHP (psia)	Sur Press (psia)
0.00	0	362	14
0.87	1253	369	6
1.75	2520	373	4
3.50	5040	384	21
5.00	7200	394	74
7.00	10080	420	231
10.50	15120	451	465
14.00	20160	491	755
16.00	23040	511	950





Fracture Gradient/Pressure of Injection Zone

Please refer to the step-rate test data provided in the above discussion on the proposed maximum injection pressure.

Annulus Fluid

The characteristics of the annulus fluid are described in Attachment 1.F, Annulus Fluid Sample.

I. Formation Testing Program

Since Quicksilver Resources Inc. operates another salt water disposal well in this area that injects into the same formation as the proposed well, Olin SWD 2J-23-S41, we do not plan to conduct an extensive formation testing program; however, we will perform any tests required by the EPA as a condition of the permit. Quicksilver does not plan to run any open-hole logs in this well since it has logs on the Olin SWD #1 well.

J. Stimulation Program

The well will be completed as an open-hole completion. No stimulation is planned on the well.

K. Injection Procedures

Injection shall be through tubing and packer set within the casing at approximately 560 feet, which is roughly 75 feet above the injection zone. The tubing and packer shall be maintained in a manner to prevent movement of fluids into or between USDW. Quicksilver will use the existing surface facilities for the Olin SWD #1 well, which consists of four (4) 400-barrel steel tanks contained within an earthen dike, a 15' X 18' pump building, and two (2) "Quadraplex" pumps, with 60 horsepower electric motors.

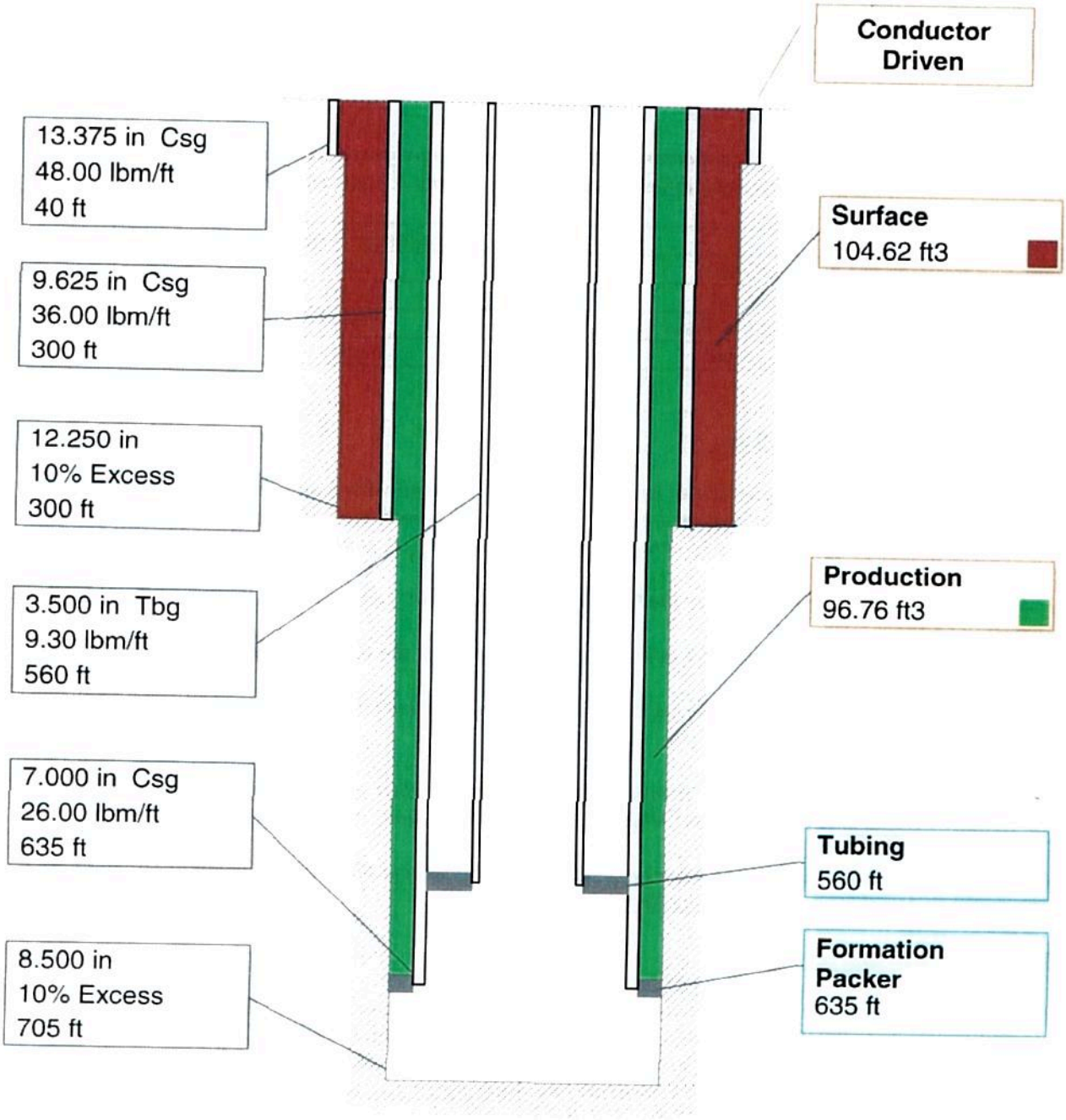
L. Construction Procedures

Tubular String	Hole Size	Setting Depth	Cement Volume	Cement Type	Cement Specs
13-3/8" casing	17-1/2"	±40	None--driven	N/A	N/A
9-5/8" casing	12-1/4"	±300'	89 sacks (105 ft.^{3} w/ 10% excess.)	Class "A"	Wt. 15.6 ppg; Yld.1.18
7" casing	8-1/2"	±635'	83 sacks (97 ft.^{3} with 10% excess.)	Class "A"	Wt. 15.6 ppg; Yld.1.18
3-1/2" tubing	7" casing	±560'	N/A	N/A	N/A

M. Construction Details

Schematic diagram shown below and Attachment I.G., Wellhead Schematic.

Olin SWD 2J-23-S41
Quicksilver Resources, Inc.
Jeffersonville Limestone
Salt Water Disposal Well



i-Handbook* - *a mark of Schlumberger

N. Changes in Fluid Injection

Not applicable to Class II wells.

O. Plans for Well Failures

Quicksilver Resources Inc. believes all wells in the area of the proposed Olin SWD 2J-23-S4 are adequately cased and cemented to prevent migration of fluids from the proposed well into any USDW or productive zones in this area. If there is a loss of mechanical integrity in the wellbore of the proposed well, injection operations will be terminated and appropriate remedial action will be taken as quickly as feasible to restore mechanical integrity. In the event that upward fluid migration occurs in the wellbore of a previously unknown, improperly plugged or unplugged well within the ¼ mile Area of Review due to injection operations in the proposed well, injection operations in the proposed well will be terminated until such fluid migration is shut-off by the proper plugging of that wellbore.

P. Monitoring Program

Quicksilver Resources Inc. plans to monitor the operations of the proposed well, Olin SWD 2J-23-S4, as shown in the schedule below, unless a different monitoring program is required by the EPA:

Parameter	***Monitoring Frequency***
Injection Pressure (psig) at Wellhead	*Weekly*
Annulus Pressure (psig) at Wellhead	*Weekly*
Flow Rate (barrels/day) of Injected Fluid	*Weekly*
Cumulative Volume of Injected Fluid	*Weekly*

Q. Plug and Abandonment Plan

The well will be plugged and abandoned in accordance with all applicable federal and state requirements at the time of plugging. The proposed plan, which complies with the existing requirements of the Kentucky Department of Mines and Minerals, Division of Oil and Gas, is to plug the well as follows:

1. A cement plug shall be placed from the bottom of the hole (±705') to the top of the New Albany Shale formation (±514').
2. A cement plug not less than 15 feet in length shall be placed at the base of the fresh water strata (the Alluvium at approximately 130 feet).
3.A cement plug shall be placed at the surface of the ground in such a manner as to not interfere with soil cultivation.

The cement plugs will be set by the "pump and plug" method or other method approved by the EPA and the Kentucky Department of Mines and Minerals, oil and gas Division.

The plugging requirements of the Kentucky Department of Mines and Minerals, Division of Oil and Gas, are shown in Attachment 1.H, Plugging Requirements.

R. Necessary Resources

Quicksilver Resources Inc. is a publicly traded company that operates over 2,000 gas and oil wells in several states, including Indiana, Kentucky Michigan, Montana, Texas, and Wyoming. (Quicksilver is the largest gas producer in Michigan). Quicksilver has financial security documents on file with the EPA and the Kentucky Department of Mines and Minerals (see Attachments 1.I. and 1.J), which should ensure that the proposed well, Olin SWD 2J-23-S4, will be properly plugged and abandoned and the wellsite properly reclaimed.

S. Aquifer Exemptions

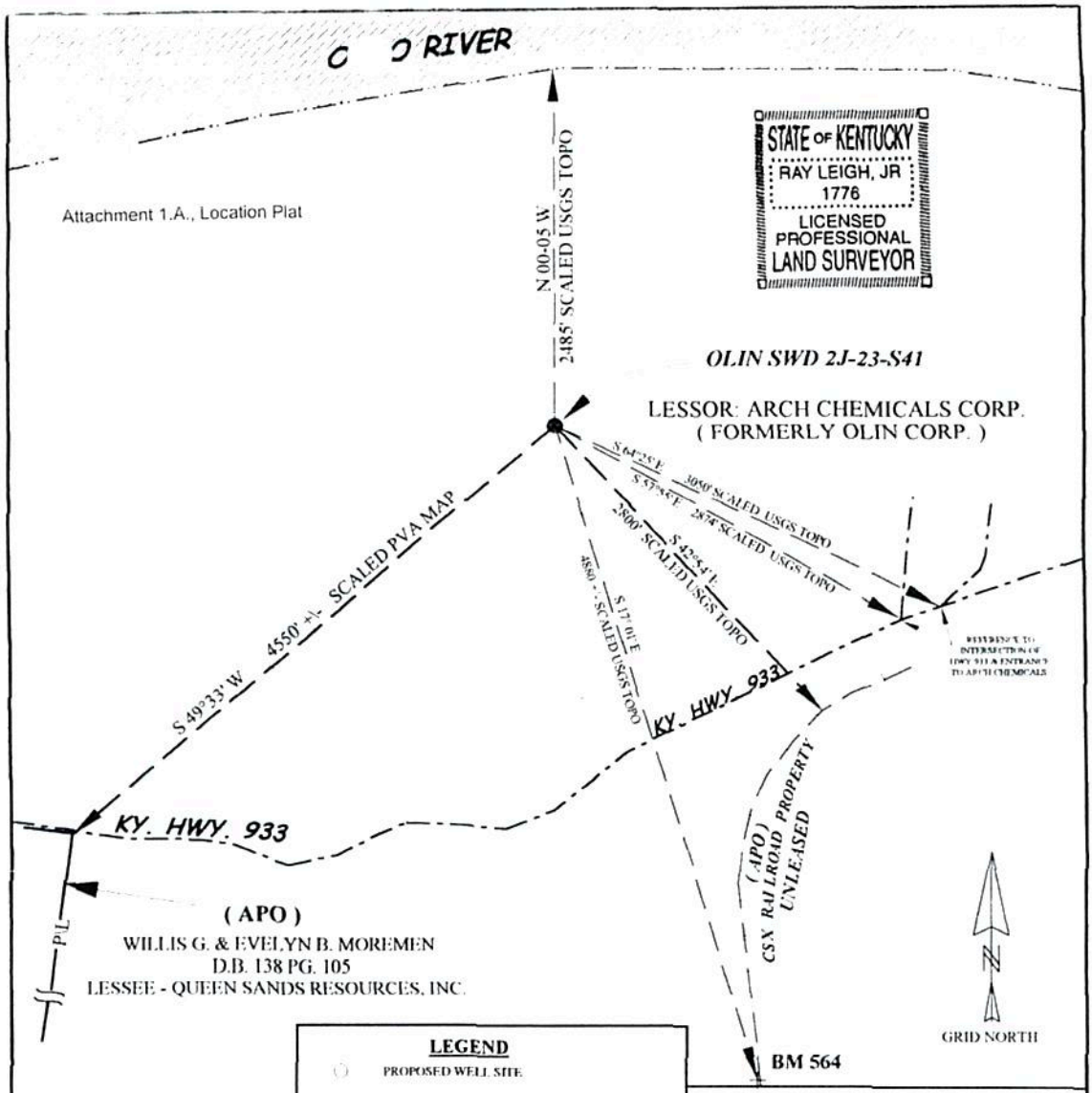
Not applicable-- an aquifer exemption is not being requested.

T. Existing EPA Permits

Quicksilver Resources Inc. operates another saltwater disposal well on this lease, the Olin #1 SWD, which was approved by the EPA for fluid injection operations on August 15, 1996 (see Attachment 1.K, EPA UIC Permit No. KY1067). The Olin #1 SWD disposes of produced saltwater into the Knox formation.

U. Description of Business

Quicksilver Resources Inc. is an independent oil and gas exploration and production company based in Fort Worth, Texas (mailing address: 777 W. Rosedale St., Suite 300, Fort Worth, TX. 76104). Quicksilver operates gas wells in this area that produce from the New Albany Shale formation. The proposed well, Olin SWD 2J-23-S41, will be used to dispose of produced water from these gas wells.



LEGEND

○	PROPOSED WELL SITE
●	OIL WELL - UNLESS OTHERWISE SHOWN
⊡	GAS WELL
⊙	INJECTION WELL
⊹	PLUGGED WELL
⊖	ABANDONED WELL, NOT PLUGGED
CLL	COMMUNITIZED LEASE LINE
P/L	PROPERTY LINE
APO	ADJOINING PROPERTY OWNER

SOURCE OF TITLE

ARCH CHEMICALS, INC.
D.B. 416 PG. 90

NOTE: OLIN SWD 2J-23-S41 IS 500 FT. OR MORE FROM PROPERTY LINES.

NO BUILDINGS LOCATED WITHIN 150 FT. OF WELL.

N 89-02 E 142.3 FT. TO OLIN #1 GAS WELL

S 06-32 W 32.5 FT. TO OLIN #1 SWD WELL

- *PROPERTY INFORMATION* OBTAINED FROM: MEADE COUNTY PVA OFFICE

- THE STATE PLANE COORDINATE IS: N: 2249382.72 E: 1530417.76 NAD 83 - KY. SOUTH ZONE

COMPANY QUICKSILVER RESOURCES ADDRESS 777 W. ROSEDALE ST. (SUITE 300) FT. WORTH, TEXAS 76104

FARM ARCH CHEMICALS WELL NO. OLIN SWD 2J-23-S41 ELEV. 455.66' (NAVD 88)

COUNTY MEADE, KY. QUADRANGLE MAUCKPORT, KY.\ IND. DATED 1970 REV. 1994

LATITUDE 38 00' 18.829" N LONGITUDE 86 07' 52.523" W

CARTER COOR. (F.N.L.) ____ (F.S.L.) 1907 FT. (F.E.L.) ____ (F.W.L.) 726 FT.

SEC. 23 LETTER S NO. 41 EXISTING LOCATION

I HEREBY CERTIFY THAT THE ABOVE PLAT IS ACCURATE AND CORRECT AND SATISFIES THE REQUIREMENTS OF 805 KAR 1:030 TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNATURE KY. P.L.S. # 1776 REGISTRATION NO.

RAYMOND E. LEIGH, JR NAME

3-29-2004 DATE

LEIGH LAND SURVEYS
622 HILL CREEK DR.
ELIZABETHTOWN, KENTUCKY 42701
PHONE: 270-737-8440 FAX: 270-765-5009
E-MAIL: RLEIGHJR@BIBTEL.COM

LOCATION MAP OF PROPOSED SALT WATER DISPERSION WELL

FILE NO. PRJ-255

PRJ.#: 255

DATE: MARCH 29, 2004

SCALE: 1" = 1000'

0' 1000' 2000'

QUICKSILVER
RESOURCES

Via Certified Mail

April 5, 2004

Mr. Steve Johnson
Plant Manager
Arch Chemicals, Inc.
2450 Olin Road
Bradenburg, KY. 40601

Re: ***Application for Permit for Class II Injection Well***
Olin SWD 2J-23-S41, Section 23, Letter "S", No. 41
Meade County, Kentucky

Dear Mr. Johnson:

In accordance with the requirements of the *U. S. Environmental Protection Agency* and the *Kentucky Department of Mines and Minerals, Division of Oil and Gas*, this is to formally notify you of Quicksilver Resources Inc.'s *Intent to Drill* the captioned well at a location 1907 feet from the south line and 726 feet from the west line of Section 23, Letter "S", No. 41, Meade County, Kentucky. A Survey Plat showing the well location is attached.

Quicksilver plans to use this well to dispose of produced salt water by injection into the interval from approximately 635 feet to 705 feet (total depth of the well). The salt water is produced from Quicksilver's New Albany Shale gas wells in this area

If you have any questions, please call me at 817-665-4934.

Sincerely,

QUICKSILVER RESOURCES INC.

Mark N. Stephenson
Regulatory Affairs Manager

777 West Rosedale Street, Suite 300
Fort Worth, Texas 76104
817-665-5000 Fax: 817-665-5005
www.qrinc.com

7003 1010 0004 5353 4343

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

OFFICIAL USE

Postage	$ .37
Certified Fee	2.30
Return Receipt Fee (Endorsement Required)	1.75
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 4.42

Postmark Here

Loi

Sent To: Mr. Steve Johnson
Street, Apt. No.; or PO Box No.: Arch Chemicals, Inc.
City, State, ZIP+4: 2450 Olin Road
Bradenburg, KY 40601

PS Form 3800, J

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Steve Johnson
Arch Chemicals, Inc.
2450 Olin Road
Bradenburg, KY 40601

COMPLETE THIS SECTION ON DELIVERY

A. Received by *(Please Print Clearly)*: DOT EMMERT
B. Date of Delivery: 4/8

C. Signature
X Dot Emmert
☐ Agent
☐ Addressee

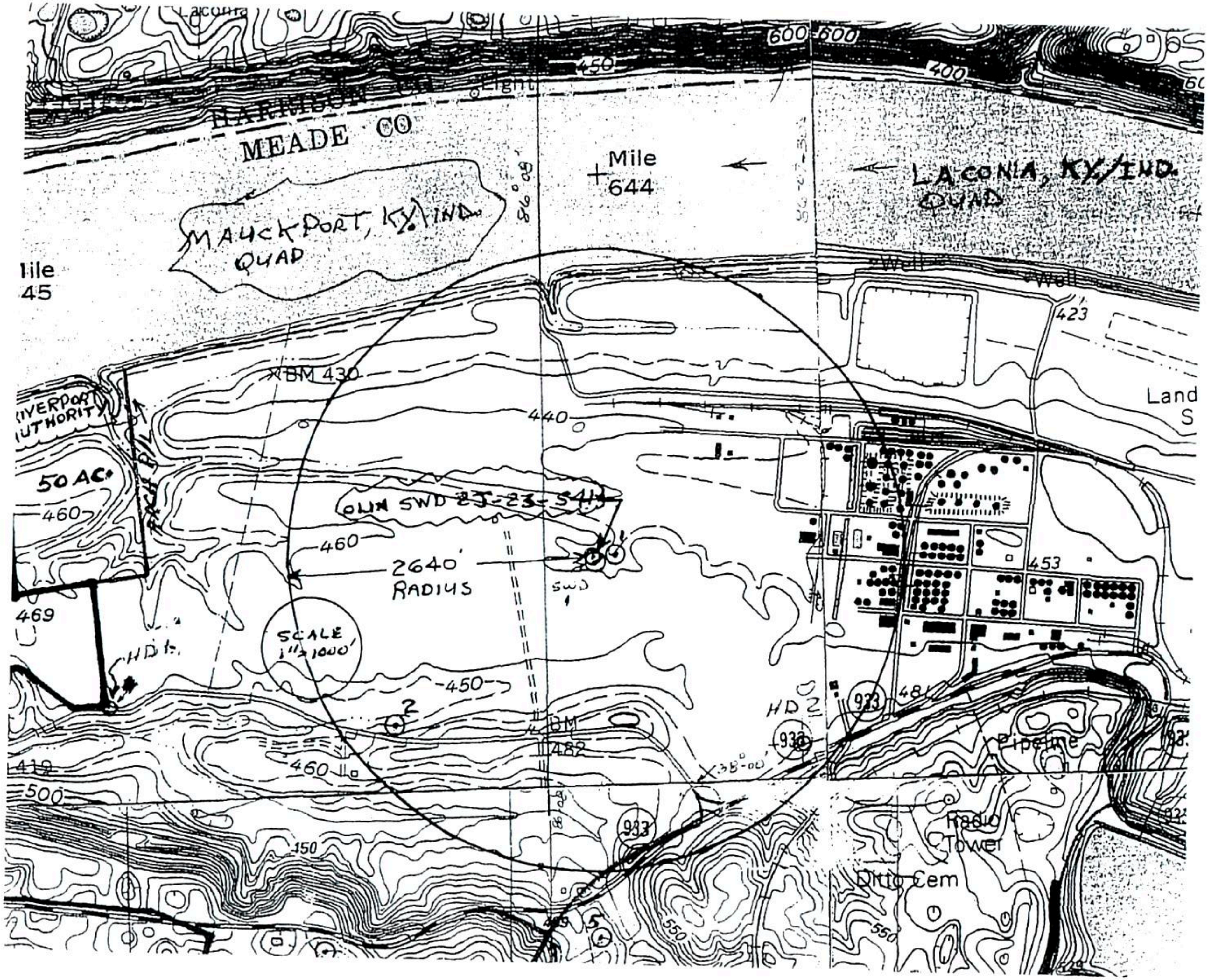
D. Is delivery address different from item 1?
☐ Yes
If YES, enter delivery address below:
☐ No

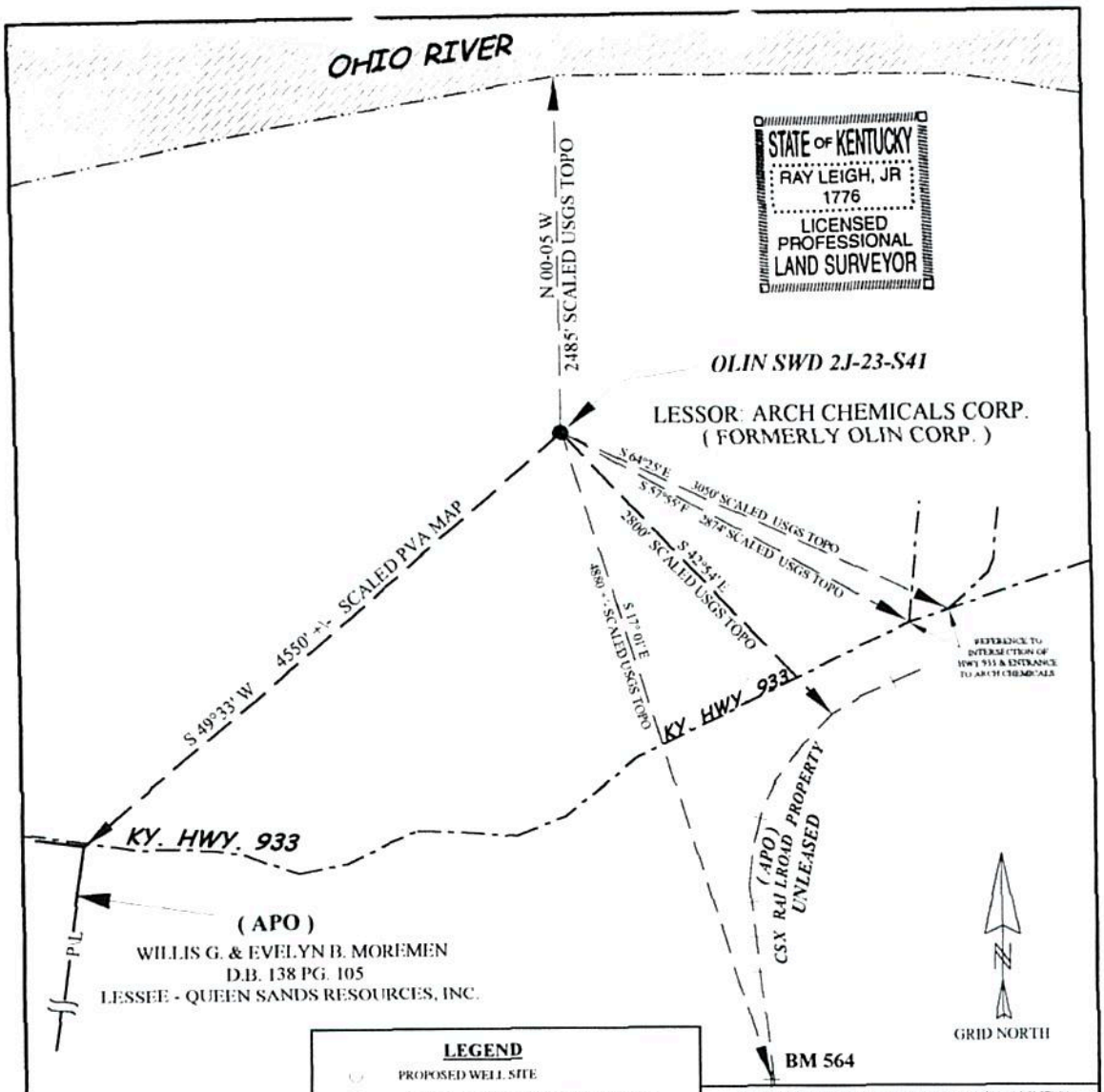
3. *Service Type*
☒ Certified Mail ☐ Express Mail
☐ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Copy from service label)* 7003 1010 0004 5353 4343

PS Form 3811, July 1999 — Domestic Return Receipt — 102595-00-M-0952


MEADE CO
Mile 644
MAUCKPORT, KY/IND. QUAD
LACONIA, KY/IND. QUAD
Mile 645
Well
423
BM 430
440
RIVERPORT AUTHORITY
50 AC
460
OLIN SWD 23-23-S41
2640' RADIUS
SWD 1
453
469
SCALE 1"=1000'
450
HD 2
933
481
BM 482
Pipeline
Radio Tower
Ditto Cem
550
500
5
2
Land



LEGEND

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- OIL WELL - UNLESS OTHERWISE SHOWN
- GAS WELL
- INJECTION WELL
- PLUGGED WELL
- ABANDONED WELL, NOT PLUGGED
- C.L. COMMUNITIZED LEASE LINE
- P.L. PROPERTY LINE
- APO ADJOINING PROPERTY OWNER

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- THE STATE PLANE COORDINATE IS: N: 2249382.72 E: 1530417.76 NAD 83 - KY. SOUTH ZONE

SOURCE OF TITLE

ARCH CHEMICALS, INC.
D.B. 416 PG. 90

COMPANY QUICKSILVER RESOURCES ADDRESS 777 W. ROSEDALE ST. (SUITE 300) FT. WORTH, TEXAS 76104

FARM ARCH CHEMICALS WELL NO OLIN SWD 2J-23-S41 ELEV. 455.66' (NAVD 88)

COUNTY MEADE, KY. QUADRANGLE MAUCKPORT, KY-IND. DATED 1970 REV. 1994

LATITUDE 38 00' 18.829" N LONGITUDE 86 07' 52.523" W

CARTER COOR. (F.N.L.) ____ (F.S.L.) 1907 FT. (F.E.L.) ____ (F.W.L.) 726 FT.

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SIGNATURE KY. P.L.S. # 1776 REGISTRATION NO.

RAYMOND E. LEIGH, JR. NAME

3-29-2004 DATE

LEIGH LAND SURVEYS
622 HILLCREEK DR.
ELIZABETHTOWN, KENTUCKY 42701
PHONE: 270-737-8440 FAX: 270-765-5009
E-MAIL: RLEIGHJR@BBTEL.COM

LOCATION MAP OF PROPOSED SALT WATER DISPERSION WELL

FILE NO PRJ-255

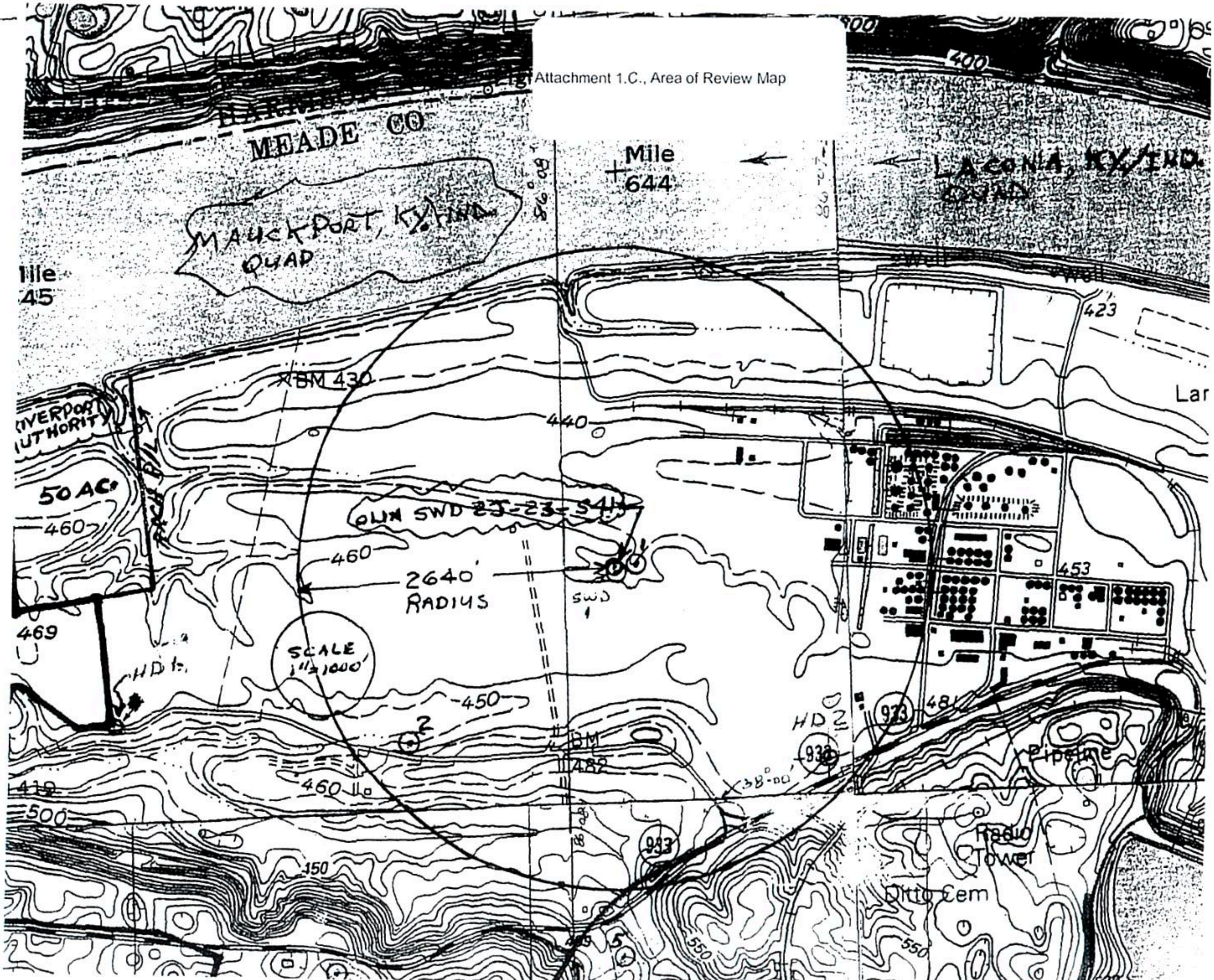
PRJ-#: 255

DATE: MARCH 29, 2004

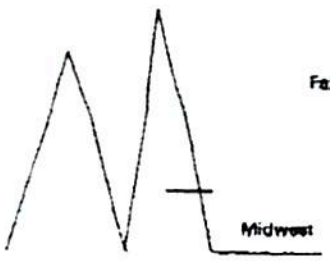
SCALE: 1" = 1000'

0' 1000' 2000'

Attachment 1.C., Area of Review Map



Attachment 1.E., Injection Fluid Sample



(616) 369-3309
(616) 369-3329
Fax: (616) 369-3331

Midwest
Analytical Laboratories, Inc.
P.O. Box 487
Kalkaska, MI 49646

Company:	Mercury Exploration, Inc. P.O. Box 1256 Gaylord, Mi. 49735
Job Number:	na
Location of Sample:	Olin Chemical #1
Date of Sample:	5/9/96
Sample of:	Brine
Sample Point:	na
Sampled By:	na
Submitted Date:	5/13/96
Date of Analysis:	5/15/96
Analysis #:	551396

EPA Method		Cations	mg/L
273.1		Sodium	23800
258.1		Potassium	222
215.1		Calcium	2580
242.1		Magnesium	1730
236.1		Iron (Total)	40
		Strontium	175
208.1		Barium	21

EPA Method		Anions	mg/L
		Chloride	34700
375.4		Sulfate	nd
310.1	Alkalinity as	Carbonate	nd
	Alkalinity as	Bicarbonate	741
376.2		Sulfide	nd
		Total Dissolved Solids	63969
120.1		Resistivity(Ohm-m)	0.092 @ 25 Deg. C
150.1		pH	6.19 @ 25 Deg. C
		Specific Gravity	1.056 @ 60 Deg. F(Water=1)

nd=not detected

HALLIBURTON SERVICES

MATERIAL SAFETY DATA SHE

(Essentially Similar to Form LSB 005.4)

CHEMICAL CODE ANHIB Inhibitor	PART NUMBER 70.15341
PACKAGE QUANTITY 55 Gallon metal drum	UNIT OF ISSUE Gallon
SERVICE USED Chemical Services	APPLICATION Corrosion inhibitor
CHEMICAL FAMILY Organic	EMERGENCY PHONE 405-251-3565 AFTER HOURS 405-251-3760

II. HAZARDOUS INGREDIENTS

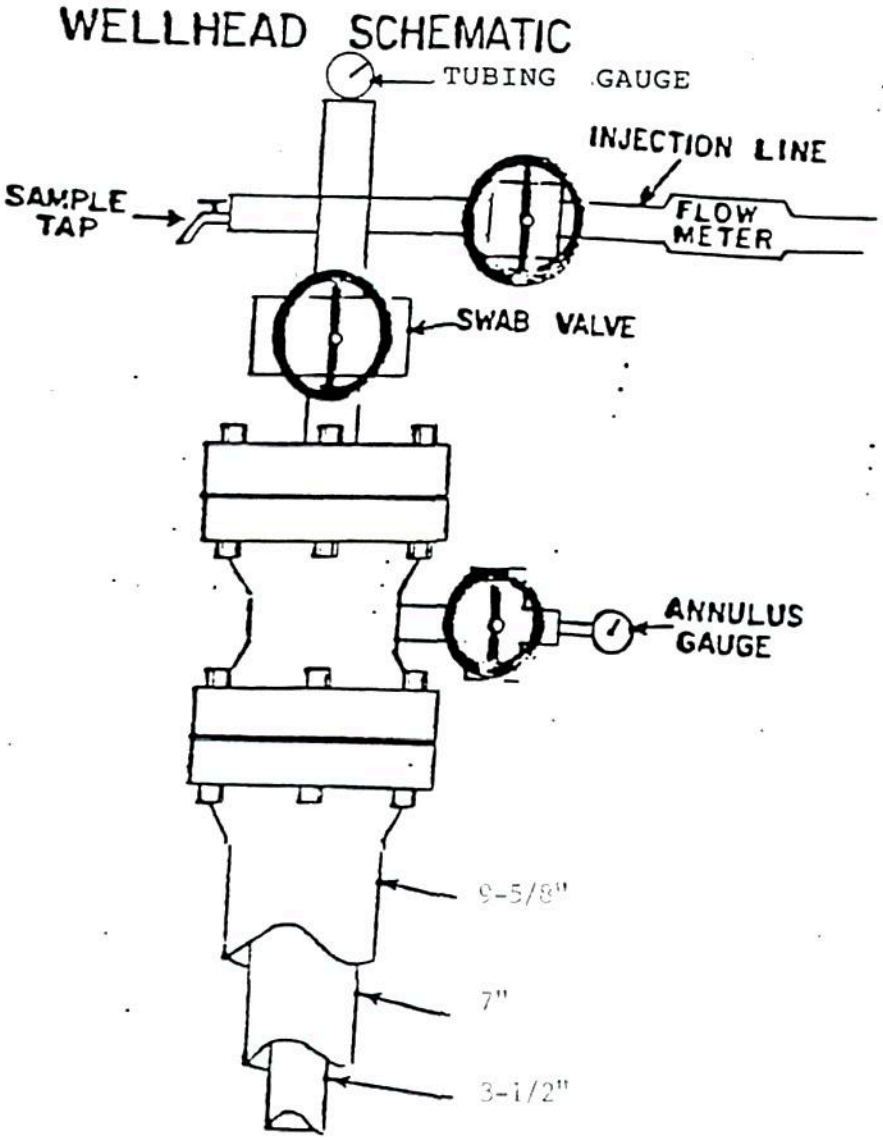
MATERIAL	%	Toxicity Data	TLV (Units)
Isopropanol	10-30	orl-man LDLo: 8600 mg/kg	400 ppm
		ihl-hmn TCLo: 400 ppm	
		TLm 96: 1000 - 100 ppm	

III. PHYSICAL DATA

APPEARANCE & ODOR	Clear, red liquid, pungent-stifling odor.		
SPECIFIC GRAVITY (H_2O = 1)	1.07	EVAPORATION RATE (Butyl Acetate = 1)	ND
BULK DENSITY	8.9 lbs/gal	VAPOR DENSITY (Air = 1)	ND
pH	8.5	VAPOR PRESSURE AT ___°C	ND
SOLUBILITY IN WATER AT 20°C gms/100 ml H_2O	Miscible	BOILING POINT 760 mm. Hg	ND
BIODEGRADABILITY	Slowly	POUR POINT	<-20°F/-29°C
PERCENT VOLATILES BY VOLUME	16	FREEZE POINT	ND

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	70°F/21°C PMCC	AUTOIGNITION TEMPERATURE	ND		
FLAMMABLE LIMITS IN AIR, % by volume		LOWER	ND	UPPER	ND
EXTINGUISHING MEDIA	Foam, dry chemical, carbon dioxide.				
SPECIAL FIRE FIGHTING PROCEDURES	Use full protective clothing and NIOSH/MSHA approved self-contained breathing apparatus required for fire fighting personnel.				
UNUSUAL FIRE AND EXPLOSION HAZARDS	May be ignited by heat, sparks, flames. Container may expode in heat of fire. Flammable vapors may spread away from spill.				


WELLHEAD SCHEMATIC
TUBING GAUGE
INJECTION LINE
SAMPLE TAP
FLOW METER
SWAB VALVE
ANNULUS GAUGE
9-5/8"
7"
3-1/2"

805 KAR 1:060. Plugging wells; noncoal-bearing strata.

RELATES TO: KRS 353.550

Attachment 1.H., Plugging Requirements

STATUTORY AUTHORITY: KRS 13A.100, 353.560

NECESSITY, FUNCTION, AND CONFORMITY: KRS 353.560 requires the department to regulate the plugging of all wells. This administrative regulation identifies the minimum acceptable requirements to plug or temporarily abandon wells drilled through noncoal-bearing strata.

Section 1. Unless written permission shall be obtained from the department, no operator or owner shall permit any well drilled for oil, gas, salt water disposal or any other purpose in connection with the production of oil and gas, to remain unplugged after such well is no longer used for the purpose for which it was drilled or converted. However, nothing herein shall prevent the department, upon application and for good cause shown, from issuing a temporary permit, for a period not exceeding two (2) years, to an operator to leave a well unplugged, and nothing herein shall alter the provisions of KRS 353.170 relative to utilizing a well for the purpose of introducing air, gas, water or other liquid pressure into or upon the producing strata for the purpose of recovering oil and gas. The permission for temporary abandonment may be renewed at the end of the two (2) year period by reapplication. All wells on which a temporary abandonment permit has been issued shall be cased and capped in such a manner so as to protect all potential oil and/or gas zones and fresh water.

Section 2. Before any work is commenced to plug and abandon any well the owner or operator thereof shall give notice to the department of his intention to abandon such well. Notice shall be given in the manner specified by the department. A duly authorized representative of the department may be present at the time and place specified to supervise the plugging of such well.

Section 3. Wells not drilled through coal-bearing strata may be plugged as follows:

(1) The bottom of the hole shall be filled to the top of each producing formation, or a bridge shall be placed at the top of each producing formation, and in either event a cement plug not less than fifteen (15) feet in length shall be placed immediately above each producing formation whenever possible.

(2) A cement plug not less than fifteen (15) feet in length shall be placed immediately below all fresh water bearing strata.

(3) A plug shall be placed at the surface of the ground in each hole plugged in such a manner as not to interfere with soil cultivation.

(4) An uncased rotary hole drilled with the aid of liquid shall be plugged with approved heavy mud up to the base of the surface string at which point a plug of not less than fifteen (15) feet of cement shall be placed. The hole shall also be capped similar to other abandoned holes.

(5) Any well in which casing has been cemented from surface to total depth and no casing can be pulled may be plugged as follows: The bottom of the hole shall be filled to the top of the producing formation and a cement plug not less than fifteen (15) feet in length shall be placed above this fill. A surface plug shall be placed as provided in subsection (3) of this section. No intermediate plugs will be required.

(6) The operator shall have the option as to the method of placing cement in the hole by:

(a) Dumb bailer;

(b) Pumping through tubing;

(c) Pump and plug; or

(d) Other method approved by the director.

Section 4. Within thirty (30) days after the plugging of any well has been accomplished, the owner or operator thereof shall file a plugging report with the department setting forth in detail the method used in plugging the well. Such report shall be made on a form provided by the department.

Section 5. When the well to be plugged may safely be used as a fresh water well, and such utilization is desired by the landowner, the well need not be filled above the required sealing plug set below fresh water; provided, that written authority for such use is secured from the landowner and filed with the department.

Section 6. If a person fails to comply with this administrative regulation, any person lawfully in possession of land adjacent to or in the neighborhood of the well may enter on the land upon which the well is located and plug the well in the manner provided in KRS 353.180(1) or this administrative regulation, and may maintain a civil action against the owner or person abandoning the well, jointly or severally, to recover the cost of plugging the well. This section shall not apply to persons owning the land on which the well is situated, and drilled by other persons. (OAG-Rg-4; 1 Ky.R. 1069; eff. 6-11-75.)

Bank of America

Attachment 1.I.

IRREVOCABLE STANDBY LETTER OF CREDIT

U.S. Environmental Protection Agency
Underground Injection Control, EPA Region IV
Atlanta Federal Center
615 Forsyth St. SW
Atlanta, GA 30303-8960

Attention: Regional Administrator

Dear Sir or Madam:

We hereby establish our Irrevocable Standby Letter of Credit No. 3038518 in your favor, at the request and for the account of

Quicksilver Resources Inc.
777 W. Rosedale St
Fort Worth, TX 76104

up to the aggregate amount of Five Thousand Eight Hundred and 00/100 U.S. Dollars ($5,800.00), available upon presentation of:

(1) Your sight draft, bearing reference to this Letter of Credit No. 3038518, and

(2) Your signed statement reading as follows: "I certify that the amount of the draft is payable pursuant to regulations issued under authority of the Safe Drinking Water Act."

This letter of credit is effective as of June 13, 2001 and shall expire on June 13, 2002, but such expiration date shall be automatically extended for a period of at least one year on June 13, 2002 and on each successive expiration date, unless, at least 120 days before the current expiration date, we notify both you and Quicksilver Resources Inc. by certified mail or overnight courier that we have decided not to extend this letter of credit beyond the current expiration date. In the event you are so notified, any unused portion of the credit shall be available upon presentation of your sight draft for 120 days after the date of receipt by both you and Quicksilver Resources Inc., as shown on the signed return receipts.

Whenever this letter of credit is drawn on under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, and we shall deposit the amount of the draft directly into the standby trust fund of Quicksilver Resources Inc. in accordance with your instructions.

This letter of credit is subject to the Uniform Customs and Practice for Documentary Credits, (1993 Revision) International Chamber of Commerce Publication No. 500 and the operations of this Bank are regulated and examined by a Federal Agency.

ROSE T. AGUSTIN
Authorized Signature

THELMA CHAN
Authorized Signature

Attachment 1.J.

QUICKSILVER
RESOURCES

March 4, 2003

State of Kentucky
Department of Mines & Mineral
Suite 201
1025 Capitol Center Drive
Frankfurt, KY 40601

Attention: Mr. Rick Bender, Director
Oil & Gas Division

RE: Name and Address Change
Cash Bond $5,000.00

Dear Mr. Bender:

Enclosed is the 2001 Annual Report showing that Quicksilver Resources purchased substantially all of the oil and gas assets of Mercury Exploration Company (tax id # 75-1608586) effective July 31, 2000. Please change the name and address of the current cash bond you have under Mercury Exploration to:

Quicksilver Resources Inc.
777 West Rosedale Suite 300
Fort Worth, Texas 76104

Quicksilver's tax ID # is 75-2756163

Please contact Anita Blakley at 817-665-4872 if you need further information.

Thank you very much for your help in this matter.

Sincerely,

MarLu Hiller
Treasurer

777 West Rosedale Street, Suite 300
Fort Worth, Texas 76104
817-665-5000 Fax: 817-665-5007
www.qrinc@.com

MERCURY EXPLORATION COMPANY

OIL AND GAS PRODUCERS

March 4, 2003

Department of Mines & Mineral
Suite 201
1025 Capitol Center Drive
Frankfurt, KY 40601

Attention: Mr. Rick Bender, Director
Oil & Gas Division

Re: Kentucky Cash Bond $5,000.00
Name and Address Change

Dear Mr. Bender:

Effective July 31, 2000 Quicksilver Resources, Inc. purchased substantially all of the oil and gas-related assets of Mercury Exploration Company. As a result, Mercury Exploration Company no longer has any oil or gas-related assets located in the State of Kentucky.

Please change the name on the deposit with the State of Kentucky from Mercury Exploration Company to Quicksilver Resources, Inc. If you have any questions, please call Ray Emerson at (817) 665-4899.

Sincerely,

Anne D. Self
President

777W. ROSEDALE ST., SUITE 300 • FORT WORTH, TEXAS 76104 • (817) 665-4999 • FAX (817) 665-5002

REQUEST TO CHANGE ACCOUNT TITLE

Date 3-4-03 CSRs Initials [illegible]

Request to: Add name Signame Remove name ________

I (we) do hereby request an account title change on CD# 5080

Please change the account title as shown below.

Current account title: Mercury Exploration

Change to: Quicksilver Resources Inc
777 W Rosedale Suite 300
Fort Worth TX 76104

New Tax ID# is applicable: 75-2756163

New Address if applicable: ________

All account holders must sign this form: x [signature]
x [signature]
x [signature]

*Obtain a new signature card to reflect these changes.
*This form must be signed by all account holders.
*If the change is due to death, a death certificate must be provided.
*Redeem CD.
*Rewrite new CD reflecting change.

COMMUNITY FIRST BANK

CERTIFICATE OF DEPOSIT
STATEMENT OF LOSS FORM

I Mercury Exploration, do hereby swear that Certificate of Deposit # 3080, dated 5-21-96, in the original amount of $ 5000 -, registered in the name(s) of Mercury Exploration has been either lost or destroyed. At the request of the above named person, a replacement Certificate of Deposit #________, has been issued in the amount of $________, the full amount due upon said Certificate of Deposit.

I shall hold the said Community First Bank harmless for all loss that may occur, and all costs, damages and expenses that said bank may sustain by reason of the payment of Certificate of Deposit.

Signature: [signature] TODD LIPBECKER Date: 3-4-03

Address: ________________

____

Subscribed and sworn to before me this ____day of __________, 2____.

State of Indiana
County of __________

____
Notary Public

My Commission Expires ____________

PEOPLES TRUST BANK COMPANY
CORYDON, INDIANA 47112
MEMBER FDIC

DATE MAY 21, 1996 308

DEPOSITOR(S) MERCURY EXPLORATION COMPANY

SOC. SEC. NO. 75-1184633

DEPOSIT THE SUM5000 DOLS00 CTS DOLLARS, $ 5,000.00

"We" means the financial institution. "You" means the depositor(s) named above. We will pay this certificate to you when you present and deliver it to us, properly endorsed (signed by you), on a maturity date. If more than one of you are named above, you will own this certificate as joint tenants with right of survivorship (and not as tenants in common). (You may change this ownership by written instructions.) We will treat any one of you as owner for purposes of endorsement, payment of principal and interest, presentation (demanding payment of amounts due), transfer and any notice to or from you. Each of you appoints the other as your agent for the purposes described above. We will use the address on our records for mailing notices to you. You cannot transfer or assign this certificate or any rights under it without our written consent.

This 32 MONTH Time Certificate of Deposit matures on JANUARY 21, 19 9

☐ PRESENT THIS CERTIFICATE PROMPTLY AT MATURITY FOR PAYMENT. IT IS NOT AUTOMATICALLY RENEWABLE AND NO INTEREST WILL ACCRUE AFTER THE MATURITY DATE SHOWN.

X X THIS CERTIFICATE MATURES ON THE MATURITY DATE STATED ABOVE. IT WILL BE AUTOMATICALLY RENEWED FOR SUCCESSIVE TERMS, EACH EQUAL TO THE ORIGINAL TERM, UNTIL ONE OF THE FOLLOWING THINGS HAPPENS: 1) THIS CERTIFICATE IS PERSONALLY PRESENTED FOR PAYMENT ON A MATURITY DATE OR WITHIN TEN DAYS AFTER THE MATURITY DATE; 2) WE RECEIVE WRITTEN NOTICE FROM YOU BEFORE A MATURITY DATE OF YOUR INTENTION TO CASH IN THIS CERTIFICATE; 3) NOT LESS THAN 14 DAYS BEFORE A MATURITY DATE WE MAIL TO YOU A WRITTEN NOTICE OF OUR INTENTION TO CASH IN THIS CERTIFICATE ON A MATURITY DATE.

INTEREST TO FIRST MATURITY DATE WILL ACCRUE AT THE YEARLY RATE OF 5.87 % USING A 365 DAY/YEAR. ACCRUED INTEREST WILL BE COMPOUNDED QUARTERLY PAID :

Notify this institution immediately of any change in the above address.

AUTOMATIC RENEWALS: Each renewal term will be the same as the original term, beginning on the maturity date. The interest rate will be the same we offer on new certificates on the maturity date which have the same term and minimum balance (if any) and other features as this original certificate. You may call us on or shortly before the maturity date and we will tell you what the interest rate will be for the next renewal term. We will not pay interest after the maturity date if this certificate is not automatically renewed.

Sandra M. Lefler
AUTHORIZED SIGNATURE

NOTICE: See Other Side for Penalty on Payment of Time Deposit Before Maturity

---

Date _____, 19 ___

No. of Signatures Required

NOTICE OF PENALTY FOR EARLY WITHDRAWAL

Dear Depositor:

This Time Deposit account has a maturity date. Except as mentioned below, you cannot withdraw any principal from this account before the maturity date without our consent, and we will charge a penalty for early withdrawal. We can only consent to an early withdrawal at the time you request it. The penalty will be an amount equal to:

☐ three months' interest on the amount withdrawn.

☐ six months' interest on the amount withdrawn.

☒ twelve months' interest on the amount withdrawn.

☐ _____

We will use the nominal (simple interest) rate in effect to calculate the amount of the penalty. We will charge the penalty first against the interest remaining in the account at the time of the withdrawal, and any excess will be deducted from the amount you withdraw.

Minimum Balance Accounts: For any time deposit account which requires a minimum initial deposit or a minimum balance, we reserve the right to treat any withdrawal which would reduce the balance remaining in the account below such minimum as a withdrawal of the entire account balance, and calculate the amount of the penalty accordingly. This right is in addition to any other conditions stated in the deposit agreement.

EXCEPTIONS: We are permitted to allow an early withdrawal and waive the above penalty if:

(1) any account owner dies or is declared incompetent, or

(2) this is an I.R.A. or Keogh account and you are at least 59½ years of age or disabled at the time of the withdrawal request, or

(3) this is an I.R.A. or Keogh account and the request for withdrawal is made within seven days of establishing the account. (The penalty in such case will be all interest earned on the amount withdrawn.)

BACKUP WITHHOLDING CERTIFICATIONS

☒ TAXPAYER I.D. NUMBER - My correct taxpayer identification number appears on the front side of this form.

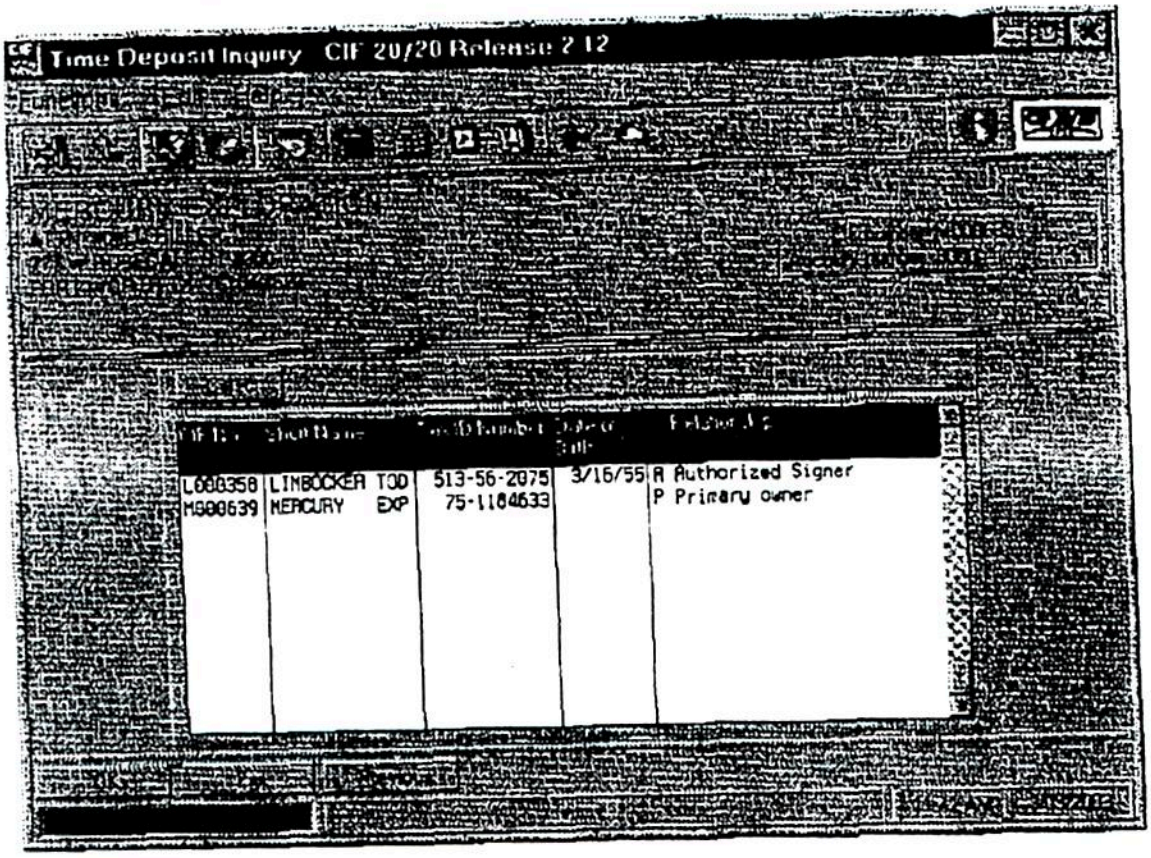
☐ EXEMPT RECIPIENTS - I am an exempt recipient under the Internal Revenue Service Regulations. (See instructions.)

☒ BACKUP WITHHOLDING - I am not subject to backup withholding either because I have not been notified that I am subject to backup withholding as a result of a failure to report all interest or dividends, or the Internal Revenue Service has notified me that I am no longer subject to backup withholding.

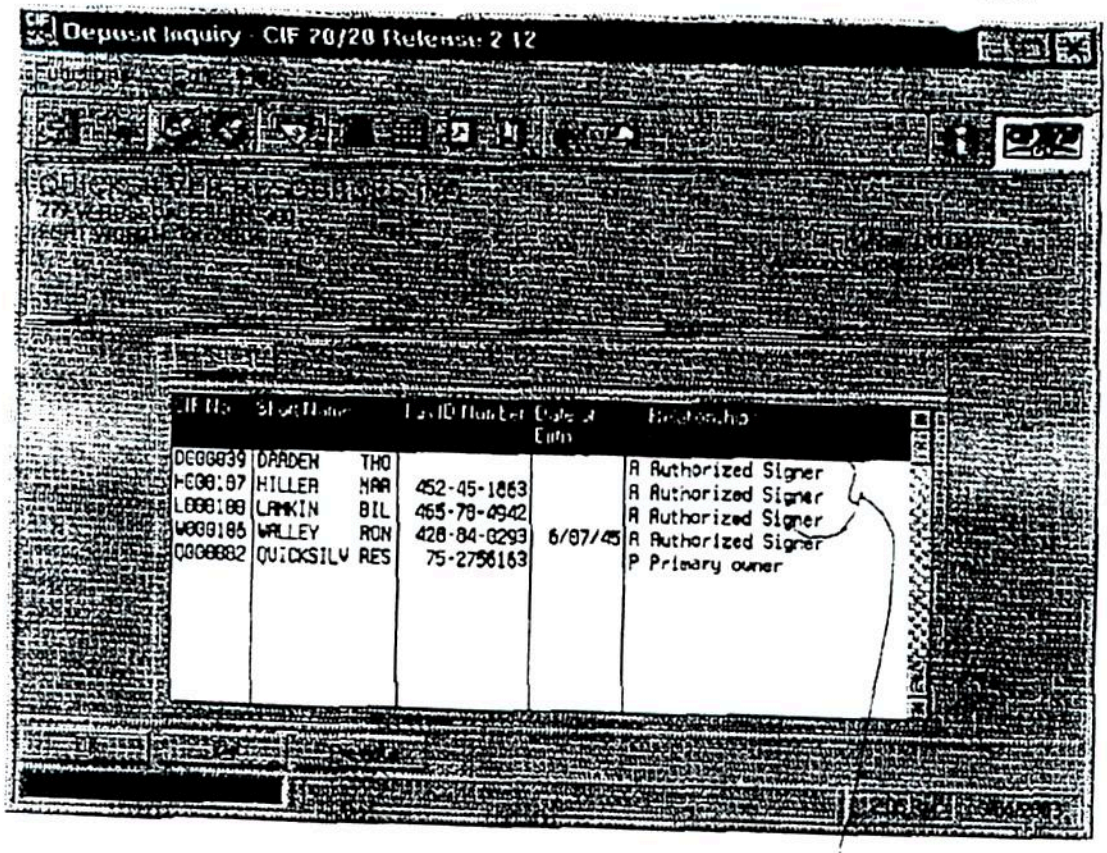
☐ NONRESIDENT ALIENS - I am not a United States person, or if I am an individual, I am neither a citizen nor a resident of the United States.

SIGNATURE: By signing below I certify under penalties of perjury that the statements checked above are true and correct.

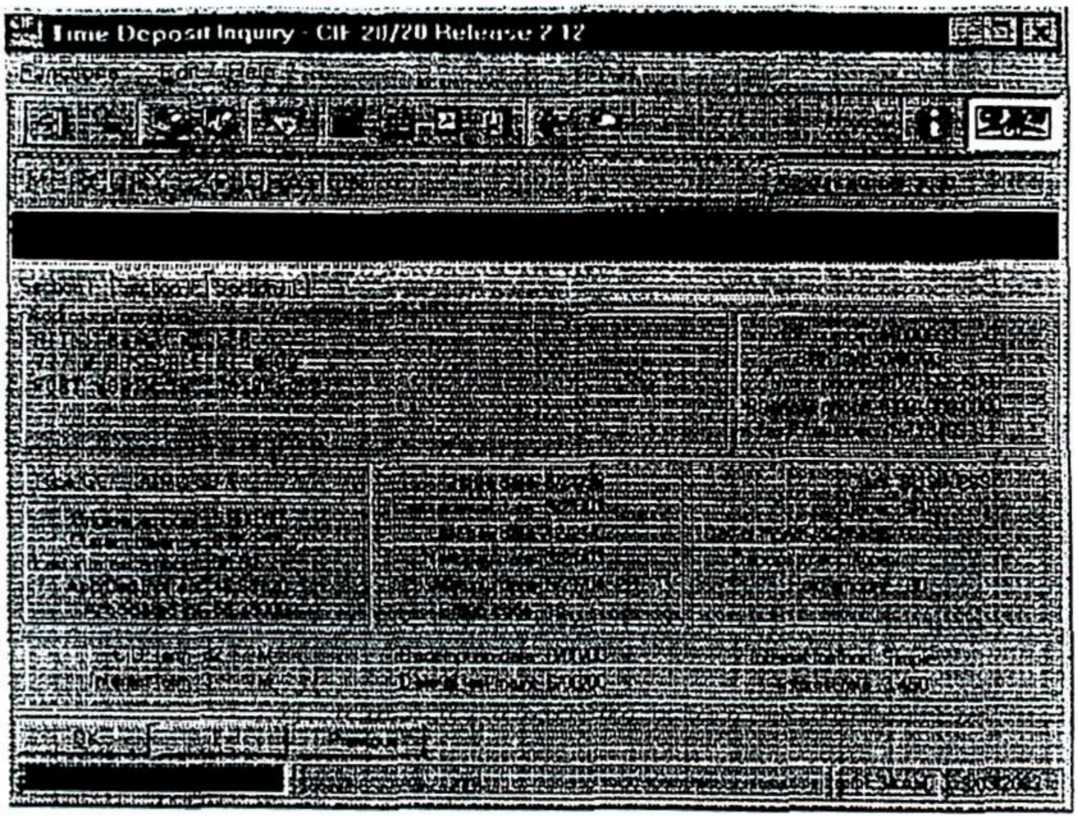
X Isabel C. Mercury Date 5-21-96



Godd must sign chg form
for Mercury



all three of these need to sign the dg form.



817-665-4872

Send us

1. orig - CD - or sign statement of loss
2. signed req to change ~~title~~
3. resolution showing chg fr. Merc. to Gen

FAX 817-665-5016

Anita

4. Make the documentation shows chg of Cap I D

MERCURY

EXPLORATION * DRILLING * PRODUCTION

May 22, 1996

Mr. Matt Steen
Department of Mines and Minerals
Commonwealth of Kentucky
3572 Iron Works Road
P.O. Box 14090
Lexington, Kentucky 40512-4090

Re: Application for Permit, Olin #1 SWD Well, Meade County, Kentucky

Dear Matt:

Enclosed please find the captioned Application for Permit, together with a cashier's check in the amount of $300.00 and a Certificate of Deposit, #3080, in the amount of $5000.00, with its related Verification of Certificate of Deposit form.

As we discussed previously, Mercury has already paid the Kentucky State Treasurer $6000.00 as bond for four wells it has recently permitted. The captioned well would require a $3000.00 bond. Since Mercury is likely to submit Applications for Permit for future wells, we might as well go to a $10,000.00 blanket bond now. You advised that the maximum amount allowed for a CD is $5000.00. Once our blanket bond is approved, please send me a refund check in the amount of $1000.00 made payable to "Mercury Exploration Company."

Also enclosed is a copy of a letter of good standing dated May 16, 1996, from Mr. Jim Slutz, Director, Division of Oil and Gas, Indiana Department of Natural Resources to Mr. Rick Bender. Mercury respectfully requests Mr. Bender to elect to accept Mr. Slutz' letter of good standing in lieu of requiring that Mercury operate in the Commonwealth of Kentucky for a period of six months before approving a blanket bond.

Please process the enclosed materials accordingly. Call me at (812) 738-8041 if you have any questions.

Thank you for your assistance.

Very truly yours,

Todd C. Limbocker, CPL
Land Manager

P. O. Box 340 405 N. Capital, Suite 104 Corydon, Indiana 47112 Ph. (812) 738-8041 Fax (812) 738-8410

PEOPLES TRUST BANK COMPANY
CORYDON, INDIANA 47112
MEMBER FDIC

DATE MAY 21, , 19 96 3080

DEPOSITOR(S) MERCURY EXPLORATION COMPANY

SOC. SEC. NO. 75-1184633

DEPOSIT THE SUM 5000 DOLS 00 CTS DOLLARS, $ 5,000.00

"We" means the financial institution. "You" means the depositor(s) named above. We will pay this certificate to you when you present and deliver it to us, properly endorsed (signed by you), on a maturity date. If more than one of you are named above, you will own this certificate as joint tenants with right of survivorship (and not as tenants in common). (You may change this ownership by written instructions.) We will treat any one of you as owner for purposes of endorsement, payment of principal and interest, presentation (demanding payment of amounts due), transfer and any notice to or from you. Each of you appoints the other as your agent, for the purposes described above. We will use the address on our records for mailing notices to you. You cannot transfer or assign this certificate or any rights under it without our written consent.

This 32 MONTH Time Certificate of Deposit matures on JANUARY 21, , 19 99 .

☐ PRESENT THIS CERTIFICATE PROMPTLY AT MATURITY FOR PAYMENT. IT IS NOT AUTOMATICALLY RENEWABLE AND NO INTEREST WILL ACCRUE AFTER THE MATURITY DATE SHOWN.

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PAID .

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Sandra M. Leffler
AUTHORIZED SIGNATURE

NOTICE: See Other Side for Penalty on Payment of Time Deposit Before Maturity

ENDORSEMENT

Date__________________________, 19 ____

____

____

____

No. of Signatures Required ________

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- ☐ **three months' interest on the amount withdrawn.**
- ☐ **six months' interest on the amount withdrawn.**
- ☒ **twelve months' interest on the amount withdrawn.**
- ☐ ______________________________________

We will use the nominal (simple interest) rate in effect to calculate the amount of the penalty. We will charge the penalty first against the interest remaining in the account at the time of the withdrawal, and any excess will be deducted from the amount you withdraw.

Minimum Balance Accounts: For any time deposit account which requires a minimum initial deposit or a minimum balance, we reserve the right to treat any withdrawal which would reduce the balance remaining in the account below such minimum as a withdrawal of the entire account balance, and calculate the amount of the penalty accordingly. This right is in addition to any other conditions stated in the deposit agreement.

EXCEPTIONS: We are permitted to allow an early withdrawal and waive the above penalty if:

(1) any account owner dies or is declared incompetent, or

(2) this is an I.R.A. or Keogh account and you are at least 59½ years of age or disabled at the time of the withdrawal request, or

(3) this is an I.R.A. or Keogh account and the request for withdrawal is made within seven days of establishing the account. (The penalty in such case will be all interest earned on the amount withdrawn.)

BACKUP WITHHOLDING CERTIFICATIONS

☑ **TAXPAYER I.D. NUMBER** - My correct taxpayer identification number appears on the front side of this form.

☐ **EXEMPT RECIPIENTS** - I am an exempt recipient under the Internal Revenue Service Regulations. (See Instructions.)

☑ **BACKUP WITHHOLDING** - I am not subject to backup withholding either because I have not been notified that I am subject to backup withholding as a result of a failure to report all interest or dividends, or the Internal Revenue Service has notified me that I am no longer subject to backup withholding.

☐ **NONRESIDENT ALIENS** - I am not a United States person, or if I am an individual, I am neither a citizen nor a resident of the United States.

SIGNATURE: By signing below I certify under penalties of perjury that the statements checked above are true and correct.

X [signature] Date 5-21-96

VERIFICATION OF CE..IFICATE OF DEPOSIT

State Form

SEND TO: DEPARTMENT OF MINES AND MINERALS
Division of Oil and Gas
P.O. Box 14090
Lexington, Kentucky 40512-4090

Gentlemen:

This is to advise you that the undersigned, pursuant to obligations set forth in KRS 353.590, does hereby assign, transfer to and pledge with the Department of Mines and Minerals all right, title and interest of the undersigned in and to the Certificate of Deposit issued by or carried with

Bank Name: Peoples Trust Bank Company	
Address: P. O. Box 505, 117 E. Chestnut Street	
(City and State): Corydon, Indiana	ZIP Code: 47112

and identified as Certificate of Deposit # 3080, in the face amount of $ 5000.00, except that interest on the certificate is the property of the assignor.

This assignment constitutes collateral security for performance of the assignor's obligations under KRS 353.590.

The undersigned appoints the Director for the Division of Oil and Gas, Department of Mines and Minerals as the true and lawful attorney of the undersigned to demand, collect, and receive all amounts, excluding interest, which shall become due under the certificate of deposit and to endorse the certificate of deposit for payment or negotiation and to endorse any commercial paper given in payment of the certificate of deposit. The Director may permit automatic renewal of the certificate of deposit on any maturity date.

The undersigned warrants that the Certificate of Deposit is contemporaneously with the execution hereof being delivered to the Director; that the Certificate of Deposit is genuine and is in all respects what it purports to be; that the undersigned is the owner thereof free and clear of all liens and encumbrances; and that the undersigned has full power, right and authority to execute and deliver this assignment.

Signature: Todd C. Limbocker	Date Signed: 5-15-96	If Corporation, Title: Todd C. Limbocker, Land Manager
Signature:	Date Signed:	If Corporation, Title:

SIGNATURE GUARANTEE AND UNDERTAKING BY THE FINANCIAL INSTITUTION

The signature(s) of the assignor(s) appearing above (were) made in the presence of the Undersigned Officer of the Financial Institution in the above collateral assignment and is (are) herewith guaranteed by it.

This institution shall save and hold harmless the Department of Mines and Minerals and the State of Kentucky from all loss, claims, and litigation which it may suffer in consequence of its acting in reliance upon and pursuant to the above assignment.

Financial Institution: Peoples Trust Bank	By: Sandra M. Leffler	
Title: CSR		Date Signed: 5/20/1996

The Director of the Division of Oil and Gas, Department of Mines and Minerals herewith acknowledges receipt of the above assignment and agrees to act thereunder.

Director, Division of Oil and Gas, Department of Mines and Minerals	Date Signed

ED-20

INDIANA DEPARTMENT OF NATURAL RESOURCES

PATRICK R. RALSTON, DIRECTOR

Division of Oil and Gas
402 W. Washington St., Room W293
Indianapolis, IN 46204

May 16, 1996

Rick Bender, Director
Dept. of Mines and Minerals
Oil & Gas Division
P.O. Box 14090
3572 Iron Works Rd.
Lexington, KY 40512-4020

RE: Mercury Exploration

Dear Rick:

In order to satisfy the requirements to obtain a blanket bond with the State of Kentucky, Mr. Todd Limbocker of Mercury Exploration Company has requested that our division provide you with information on his company's current enforcement status with the State of Indiana.

A review of division records indicates that Mercury Exploration Company currently has no outstanding enforcement actions and are considered in good standing with the division.

If you need any additional information regarding this issue, please feel free to give me a call at (317) 232-4055.

Sincerely,

Jim Slutz, Director
Division of Oil & Gas

cc: Todd Limbocker

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

AUG 16 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

REF: 4WM-GWP

Mr. Thomas F. Darden, President
Mercury Exploration Company
405 N. Capital Ste. 105
Carydon, IN 47712

SUBJ: Final UIC Permit No. KYI0671
Effective: AUG 14 1996
Permit Writer: William Mann

Dear Mr. Darden:

Enclosed is the Underground Injection Control (UIC) permit referenced above. This action constitutes the U. S. Environmental Protection Agency's final permit decision in accordance with 40 C.F.R. §124.15(a). Under 40 C.F.R. §124.19, any person who filed comments on the draft permit or participated in the public hearing may contest this decision by petitioning the Administrator to review any condition of the permit decision. In this case, since no public hearing was held and no comments were filed during the public notice period, no appeal may be taken regarding this decision. Pursuant to 40 C.F.R. §124.15(b), this permit will be effective as specified in the permit. Information on legal matters may be obtained by contacting Ms. Melissa Heath, Assistant Regional Counsel, at (404) 347-2309.

Sincerely,

Gail Vanderhoogt, for

Robert F. McGhee, Director
Water Management Division

Enclosure

U. S. ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT
AUTHORIZATION TO OPERATE A CLASS II INJECTION WELL
EPA UIC PERMIT NUMBER KYI0671

Pursuant to the Underground Injection Control regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations, Parts 124, 144, 146 and 147,

Mercury Exploration Company
405 N. Capitol, Ste. 105
Corydon, IN 47111

is hereby authorized to construct, operate, and plug and abandon the following Class II disposal injection well:

Olin #1 SWD
Meade County, Kentucky
Carter Coordinate 23-S-41
1875' FSL x 725' FWL

This authorization is in accordance with the limitations, monitoring requirements and other conditions set forth herein. This permit consists of this cover sheet; Part I, 6 pages; and Part II, 13 pages.

All references to Title 40 of the Code of Federal Regulations are to regulations that are in effect on the date that this permit becomes effective.

This permit shall become effective on AUG 14 1996.

This permit and the authorization to inject shall remain in full force and effect during the operating life of the well, unless this permit is otherwise modified, revoked and reissued, terminated, or a minor modification is made as provided at 40 C.F.R. §§144.39, 144.40 and 144.41. This permit shall be reviewed at least once every five years from the effective date.

AUG 14 1996
Date

Gail Vanderhoogt, for
Robert F. McGhee, Director
Water Management Division
U.S. Environmental Protection Agency
Region 4

PART I

WELL SPECIFIC CONDITIONS

SECTION A. CONSTRUCTION REQUIREMENTS

1. Casing and Cementing

The permittee shall case and cement the well and maintain all casing and cement so as to prevent the movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of the well shall be designed for the life expectancy of the well. Construction of this well shall be performed as specified in Attachments L & M of the permit application.

2. Tubing and Packer

Injection may only take place through tubing with a packer set within the casing no higher than 2230 feet below land surface. The tubing and packer shall be maintained in a manner which is compatible with the injection operation specified in Part I, Section B, and which prevents the movement of fluids into or between underground sources of drinking water.

3. Logs, Tests and Reports

The following tests and reports shall be prepared and submitted to EPA to demonstrate mechanical integrity:

(a) A demonstration of the mechanical integrity of the well is required before injection can be authorized. The demonstration will consist of a pressure test on the tubing/casing annulus to at least 300 psig with less than 3% pressure loss in 30 minutes. The permittee shall contact EPA to arrange a date to conduct this test. A representative of EPA will be present to witness this test. If the well fails the test, the permittee shall cease injection operations until the problem is corrected and mechanical integrity can be demonstrated.

(b) The permittee shall prepare a report, including procedures and results, of the logging and testing programs. Each log shall include a written interpretation prepared by a knowledgeable log analyst. The report must be submitted in accordance with Part I, Section A, item 4, and shall be signed in accordance with Part II, Section E, item 11, of this permit.

4. Commencing Injection

The well authorized by this permit may not commence injection until:

(a) Construction is complete, and the permittee has submitted to the Director, by certified mail with return receipt requested, a notice of completion using EPA Form 7520-10, and either:

(i) The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or

(ii) The permittee has not received, within thirteen (13) days of the date of the Director's receipt of the notice required above, notice from the Director of his or her intent to inspect or otherwise review the new injection well, in which case prior inspection or review is waived and the permittee may commence injection.

(b) The permittee has demonstrated to EPA that the injection well has mechanical integrity, and has submitted the reports as specified in Part I, Section A, item 3.

SECTION B. OPERATING REQUIREMENTS

1. Injection Operation

Beginning on the date that Part I, Section A, item 4, is completed and lasting through the term of this permit, the permittee is authorized to inject only fluids brought to the surface in connection with conventional oil and natural gas production from the permittee's operations in Meade County, Kentucky for disposal operations under the following conditions:

(a) Injection Zone

Injection shall be limited to the Knox Group in the open hole interval between 2270 and 3000 feet below land surface.

(b) Injection Pressure Limitation

(i) Injection pressure shall not initiate fractures or propagate existing fractures in the injection

zone. The maximum allowable wellhead injection pressure for the injection well will initially be established at 1000 psig. If the permittee wishes to inject above 1000 psig, it shall be proven through the use of a step-rate injectivity test, that such additional pressure will not fracture the injection zone. Upon approval by the Director, the permittee may inject at the maximum pressure attained during any step-rate test conducted on the injection well authorized by this permit provided the test proves such pressure will not fracture or extend fractures in the injection zone. Step-rate injectivity test procedures must be approved by the Director prior to conducting the test and the test may be witnessed by EPA or an agent designated by EPA.

(ii) Injection at a pressure which initiates or propagates fractures in the confining zone or causes the movement of injection or formation fluids into an underground source of drinking water is prohibited.

(iii) Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

2. Annulus Operation

The annulus between the tubing and the long-string casing shall be filled with brine or other fluid as approved by the Director. The annulus pressure shall be maintained at 0 psig.

The annulus shall be monitored with a gauge designed to indicate both a vacuum (below atmospheric) and positive pressure (above atmospheric). The permittee shall comply with Part I, Section B, item 3, when a change in the annulus pressure of 15 psig occurs. The permittee shall provide an explanation to the Director for the change in pressure and measures that will be taken to restore annulus pressure to achieve compliance with this Section. If the cause of annulus pressure change is not corrected within 48 hours, the permittee shall cease injection unless such order to cease operation is waived by the Director.

3. Loss of Mechanical Integrity During Operation

The permittee shall cease injection if a loss of mechanical integrity as defined at 40 C.F.R. §146.8 becomes evident during operation. Operation shall not be resumed until the

permittee has complied with the provisions of Part II, Section G, of this permit regarding mechanical integrity demonstration and testing.

The permittee shall notify the Director of the loss of mechanical integrity in accordance with the reporting procedures in Part II, Section E, item 12(d).

SECTION C. MONITORING REQUIREMENTS

1. Sampling and Analysis Methods

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Grab samples shall be used for the laboratory analysis of the physical and chemical characteristics as specified in Part I, Section C, item 3(a). Test methods and procedures shall be as specified at 40 C.F.R. §136.3 or 40 C.F.R. Part 261, Appendix III. When the analytical method for a particular parameter is not specified at either 40 C.F.R. §136.3 or 40 C.F.R. Part 261, Appendix III, the permittee must obtain the Director's approval of the method used. The permittee shall identify the types of tests and methods used to generate all monitoring data. Reports to be generated from monitoring data are specified in Part I, Section D.

2. Injection Operation Monitoring

The permittee shall monitor the operation of the injection well as follows:

Parameter	Monitoring Frequency
Injection Pressure (psig) at Wellhead	Weekly
Annulus Pressure (psig) at Wellhead	Weekly
Flow Rate (barrels/day) of Injected Fluid	Weekly
Cumulative Volume (barrels) of Injected Fluid	Weekly

Observation and recording of injection pressure, annulus pressure, flow rate and cumulative volume shall be made over equal time intervals beginning on the date on which the well commences operation. Recordings shall be of representative values.

3. Injection Fluid Analysis

The permittee shall conduct an injection fluid analysis at least once every twelve (12) months and whenever changes are made to the injection fluid. Analyses shall be made beginning within twelve (12) months from the effective date of this permit, or twelve (12) months from the most recent analysis, whichever is later. An analysis must include:

(a) pH, total dissolved solids, and specific gravity; and

(b) a list of all chemicals and their composition used for any well stimulation and fracturing during that sampling year; and a list of any additives used and their chemical composition, including any inhibitors used to prevent scaling, corrosion, or bacterial growth. These lists should indicate the brand name of the product and the manufacturer.

On the written request of EPA, an injection fluid analysis shall include the following additional constituents: barium, calcium, total iron, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, carbon dioxide, dissolved oxygen, hydrogen sulfide, and purgeable aromatic hydrocarbons.

SECTION D. REPORTING REQUIREMENTS

1. Reports on Well Tests and Workovers

Within ninety (90) days after the completion of the activity, the permittee shall report to the Director the results of the following:

(a) Mechanical integrity tests, other than those specified in Part I, Section A, item 3; and

(b) Any well workover, logging or other test data, other than those specified in Part I, Section A, item 3, revealing downhole conditions.

2. Reporting of Monitoring Results

Monitoring results, as specified in Part I, Section C, shall be reported each year on EPA Form 7520-11 and must be postmarked by the 28th day of the month following the first full year after the effective date of this permit.

Copies of the monitoring results required by Part I and all other reports required by Part II shall be submitted to the Director at the following address:

U. S. Environmental Protection Agency
Region 4, Water Management Division
Ground Water Protection Branch
Underground Injection Control Section
345 Courtland Street, NE
Atlanta, Georgia 30365

3. Reporting of New Wells Drilled Within the Area of Review (AOR)

Within ten (10) days after spud date, the permittee shall report to the Director by certified mail, return receipt requested, the construction plans for any new well within the AOR of the permitted facility that will penetrate the confining zone or injection zone. The permittee shall provide information on proposed construction (including location and quantities of cement), location and depth. This requirement applies to any construction activity regardless of ownership of the well.

If the construction of the new well will not protect USDWs from contamination, the Director may terminate the permit under 40 C.F.R. §144.40(a)(3), if he or she determines that continued injection may endanger human health or the environment.

SECTION E. PLUGGING AND ABANDONMENT PLAN

Plugging and abandonment of the permitted injection well shall be in accordance with Part II, Section F, of this permit and 40 C.F.R. §146.10.

The plugging of this injection well shall be performed in the manner described in Attachment Q of the permit application.

PART II
GENERAL PERMIT COMPLIANCE

A. EFFECT OF PERMIT

The permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The permittee, authorized by this permit, shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence or that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically authorized in this permit is prohibited. Compliance with this permit does not constitute a defense to any action brought under the SDWA, or any other common or statutory law or regulation. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local law or regulations. Nothing in this permit shall be construed to relieve the permittee of any duties under applicable regulations.

B. PERMIT ACTIONS

1. Modification, Revocation, Reissuance and Termination. The Director may, for cause or upon request from the permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 CFR §§ 144.12, 144.39, and 144.40, including but not limited to the following:

   (a) Alterations. There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in this permit.

   (b) Information. The Director has received information which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and would have justified the application of different permit conditions at the time of issuance.

(c) New regulations. The standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued.

(d) Compliance schedules. The Director determines good cause exists for modification of a compliance schedule, such as an act of God, strike, flood, or materials shortage or other events over which the permittee has little or no control and for which there is no reasonably available remedy.

(e) Proposed transfer. The Director receives notification of a proposed transfer of the permit.

(f) Noncompliance. Noncompliance by the permittee with any condition of the permit.

(g) Relevant facts. The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time.

(h) Endangerment. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.

Also, the permit is subject to minor modifications for cause as specified in 40 CFR §144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes, or anticipated noncompliance on the part of the permittee does not stay the applicability or enforceability of any permit condition.

The submittal of an updated application may be required prior to the Director granting a request for permit modification.

2. Transfer of Permits. This permit is not transferable to any person except after notice to and approval by the Director, and in compliance with the requirements and conditions of 40 CFR §144.38.

The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Safe Drinking Water Act.

This permit may be transferred to a new owner or operator by modification according to 40 CFR §144.41(d), if the Director determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee has been submitted to the Director.

C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

D. CONFIDENTIALITY

In accordance with 40 CFR Part 2 and §144.5, any information submitted to EPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the validity of the claim will be assessed in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

1) The name and address of the permittee;

2) Information which deals with the existence, absence or level of contaminants in drinking water.

E. DUTIES AND REQUIREMENTS

1. Duty to Comply. The permittee shall comply with all applicable UIC Program regulations and conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit issued in accordance with 40 CFR §144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. Such non-compliance may also be grounds for enforcement action under RCRA.

2. Penalties for Violations of Permit Conditions. Any person who violates a permit requirement is subject to civil penalties, fines, and other enforcement action under the SDWA and may be subject to such actions pursuant to RCRA. Any person who willfully violates permit conditions may be subject to criminal prosecution.

3. Continuation of Expiring Permits.

   (a) Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit a complete application for a new permit at least 180 days before this permit expires.

   (b) Permit Extensions. The conditions of an expired permit may continue in force in accordance with 5 U.S.C. 558(c) until the effective data of a new permit, if:

      (1) The permittee has submitted a timely application which is a complete application for a new permit; and

      (2) The Director, through no fault of the permittee, does not issue a new permit with an effective date on or before the expiration date of the previous permit, and

      (3) The new permit has not been denied, or if a denial has been appealed, final agency action has not occurred in accordance with 40 CFR §124.19(f)(1).

   (c) Effect. Permits continued under 5 U.S.C. 558(c) remain fully effective and enforceable.

   (d) Enforcement. When the permittee is not in compliance with the conditions of the expiring or expired permit the Director may choose to do any or all of the following:

      (1) Initiate enforcement action based upon the permit which has been continued;

(2) Issue a notice of intent to deny the new permit. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;

(3) Issue a new permit under 40 CFR Part 124 with appropriate conditions; or

(4) Take other actions authorized by Underground Injection Control regulations.

(e) State Continuation. An EPA issued permit does not continue in force beyond its expiration date under Federal law if at that time a State has primary enforcement authority. A State authorized to administer the UIC program may continue either EPA or State-issued permits until the effective date of the new permits, if State law allows. Otherwise, the facility or activity is operating without a permit from the time of expiration of the old permit to the effective date of the State-issued new permit.

4. Need to Halt or Reduce Activity not a Defense. It shall not be a defense, for permittee in an enforcement action, that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

5. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

6. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.

7. Duty to Provide Information. The permittee shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. Inspection and Entry. The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

   (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this permit;

   (b) Have access to and copy, at reasonable times, any records that are kept under the conditions of this permit;

   (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

   (d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by SDWA, any substances or parameters at any location.

9. Records.

   (a) The permittee shall retain records and all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation and copies of all reports required by this permit for a period of at least five years from the date of the sample, measurement or report.

   (b) The permittee shall maintain records of all data required to complete the permit application form for this permit and any supplemental information submitted under 40 CFR §144.31 for a period of at least five years from the date the application was signed. These periods may be extended by request of the Director at any time.

(c) The permittee shall retain records concerning the nature and composition of all injected fluids until three years after the completion of plugging and abandonment which has been carried out in accordance with the attached plugging and abandonment plan, and is consistent with 40 CFR §146.10.

(d) The permittee shall continue to retain such records after the retention period specified by paragraphs (a) to (c) above, unless he delivers the records to the Director or obtains written approval from the Director to discard the records.

(e) Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;

(2) The individual(s) who performed the sampling or measurements;

(3) A precise description of both sampling methodology and the handling (custody) of samples;

(4) The date(s) analyses were performed;

(5) The names of individual(s) who performed the analyses;

(6) The analytical techniques or methods used; and

(7) The results of such analyses.

10. Monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Monitoring results shall be reported at the intervals specified in Part I of this permit.

11. Signatory Requirements.

(a) All reports or other information, required to be submitted by this permit or requested by the Director, shall be signed and certified in accordance with 40 CFR §144.32, as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this permit, a responsible corporate officer means: (1) a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy - or decision making functions for the corporation, or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding 25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporation procedures.

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official: or

(4) A duly authorized representative.

(b) A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) The written authorization is submitted to the Director.

(c) If an authorization under paragraph (b) above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a

new authorization satisfying the requirements of parag (b) of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representat

(d) Any person signing a document under paragraphs 11(a) or of this Section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the syster or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penal ties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

12. Reporting Requirements.

(a) Planned Changes. The permittee shall give written noti to the Director, as soon as possible, of any planned physical alterations or additions to the permitted faci

(b) Anticipated Noncompliance. The permittee shall give ad notice to the Director of any planned changes in the pe facility or activity which may result in noncompliance permit requirements.

(c) Compliance Schedules. Reports of compliance or noncomp ance with, or any progress reports on, interim and fina requirements contained in any compliance schedule of th permit shall be submitted no later than 30 days followi each schedule date.

(d) Twenty-four Hour Reporting.

(1) The permittee shall report to the Director any compliance which may endanger health or the env ment. Any information shall be provided orally

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within 24 hours from the time the permittee becomes aware of the circumstances. The following shall be included as information which must be reported orally within 24 hours:

(i) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water.

(ii) Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between underground sources of drinking water.

(2) A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

(e) Other Non-Compliance. The permittee shall report all other instances of noncompliance not otherwise reported at the time monitoring reports are submitted. The reports shall contain the information listed in Part II, Section E, Item 12(d)(2) above.

(f) Other Information. When the permittee becomes aware that he failed to submit any relevant facts in the permit application or submitted incorrect information in a permit application or in any report to the Director, the permittee shall submit such facts or information within 10 days.

F. PLUGGING AND ABANDONMENT

1. Notice of Plugging and Abandonment. The permittee shall notify the Director no later than 45 days before conversion or abandonment of the well. The Director may allow a shorter notice period upon written request.

2. Plugging and Abandonment. The permittee shall plug and abandon the well consistent with 40 CFR § 146.10, as provided for in the plugging and abandonment plan incorporated as a part of this permit. Plugging and abandonment shall be completed to ensure that fluids are not allowed to move either into a USDW or from one USDW to another.

Revisions to the Plugging and Abandonment Plan must be submitted to the Director no less than 45 days prior to plugging and abandonment. The Director must approve the revisions prior to the start of plugging operations.

Within 60 days after plugging a well, or at the time of the next quarterly report (whichever is shorter), the permittee shall submit a report to the Director which includes all supporting documentation such as logs and test results. The report shall be certified as accurate by the person who performed the plugging operation, and shall consist of either:

(a) A statement that the well was plugged in accordance with the plan previously submitted to the Director; or

(b) If the actual plugging differed from the approved plan, a statement defining the actual plugging and why the Director should approve such deviation. Any deviation from a previously approved plan may be cause for the Director to require the operator to replug the well.

3. Inactive Wells. After a cessation of injection for two years the permittee shall plug and abandon the well in accordance with the plan unless he:

(a) Provided notice to the Director including a demonstration that the well will be used in the future; and

(b) Described actions or procedures, which are deemed satisfactory by the Director, that the permittee will take to ensure that the well will not endanger USDWs during the period of temporary abandonment. These actions and procedures shall include compliance with the technical requirements applicable to active injection wells unless waived, in writing, by the Director.

G. MECHANICAL INTEGRITY

1. Standards. All injection well(s) must have and maintain mechanical integrity consistent with 40 CFR §146.8.

2. Prohibition Without Demonstration. The permittee shall not commence or continue injection activity after the effective date of this permit unless the permittee has demonstrated that the well covered by this permit has mechanical integrity in accordance with 40 CFR §146.8 and the permittee has received written notice from the Director that such demonstration is satisfactory.

3. Subsequent Mechanical Integrity Demonstrations. A demonstration of mechanical integrity in accordance with 40 CFR §146.8 shall be made no later than five years from the date of the last approved demonstration. Mechanical integrity shall also be demonstrated any time the tubing is removed from the well, the packer is reset, or a loss of mechanical integrity becomes evident during operation. Furthermore, the Director may by written notice require the permittee to demonstrate mechanical integrity at any time. The permittee shall notify the Director of his intent to demonstrate mechanical integrity at least 30 days prior to such demonstration. The Director may allow a shorter time period if it would be sufficient to enable EPA to adequately respond. The permittee shall report the results of a mechanical integrity demonstration within 90 days after completion and in accordance with Part II, Section E, item 11.

4. Loss Of Mechanical Integrity. If the permittee or the Director finds that the well fails to demonstrate mechanical integrity during a test, or a loss of mechanical integrity as defined by 40 CFR §146.8 becomes evident during operation, the injection operation shall be halted immediately and shall not be resumed until the Director gives approval to recommence injection.

5. Test Methods to be Used for Mechanical Integrity Test (MIT). A plan for logging and testing the well for mechanical integrity shall be prepared and submitted for the Director's approval at least 60 days prior to each proposed MIT demonstration date. The Director may allow a shorter time period if it would be sufficient to enable EPA to adequately respond.

   The plan shall propose logs and tests specified in 40 CFR §146.8 (as amended from time to time by EPA to include additional approved logs and tests, as published in the Federal Register). The plan shall also propose standards that will be used for evaluating the results of logging and testing. Mechanical integrity will be confirmed if the well logs and test data meet or exceed the standards approved as a result of the Director's review of the plan.

H. FINANCIAL RESPONSIBILITY

1. Financial Responsibility. The permittee shall maintain continuous compliance with the requirement to maintain financial responsibility and resources to close, plug, and abandon the underground injection well(s). The permitte shall not substitute an alternative demonstration of financial responsibility from that which the Director has approved, unless he has previously submitted evidence of that alternative demonstration to the Director and the Director notifies him that the alternative demonstration of financial responsibility is acceptable. The Director may, on a periodic basis, require the holder of a permit to revise the estimate of the resources needed to plug and abandon the well to reflect inflation of such costs and a revised demonstration of financial responsibility, if necessary.

2. Insolvency. In the event of:

   (a) the bankruptcy of the trustee or issuing institution of the financial mechanism, or

   (b) suspension or revocation of the authority of the trustee institution to act as trustee, or

   (c) the institution issuing the financial mechanism loses its authority to issue such an instrument, the permittee must notify the Director, within ten (10) business days. The owner or operator must establish other financial assurance or liability coverage acceptable to the Director, within 60 days after such an event.

An owner or operator must also notify the Director by certified mail of the commencement of voluntary OR INVOLUNTARY proceedings under Title 11 (Bankruptcy), U.S. Code naming the owner or operator as debtor, within 10 business days after the commencement of the proceeding. A guarantor of a corporate guarantee must make such a notification if he is named as debtor, as required under the terms of the guarantee.

I. DEFINITIONS

All terms used in this permit, if not specifically defined in the permit, are defined at 40 C.F.R. Parts 144, 145, 146 and 147.

dump area for New Albany Project Files

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Attachment 1.D., Log Section

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